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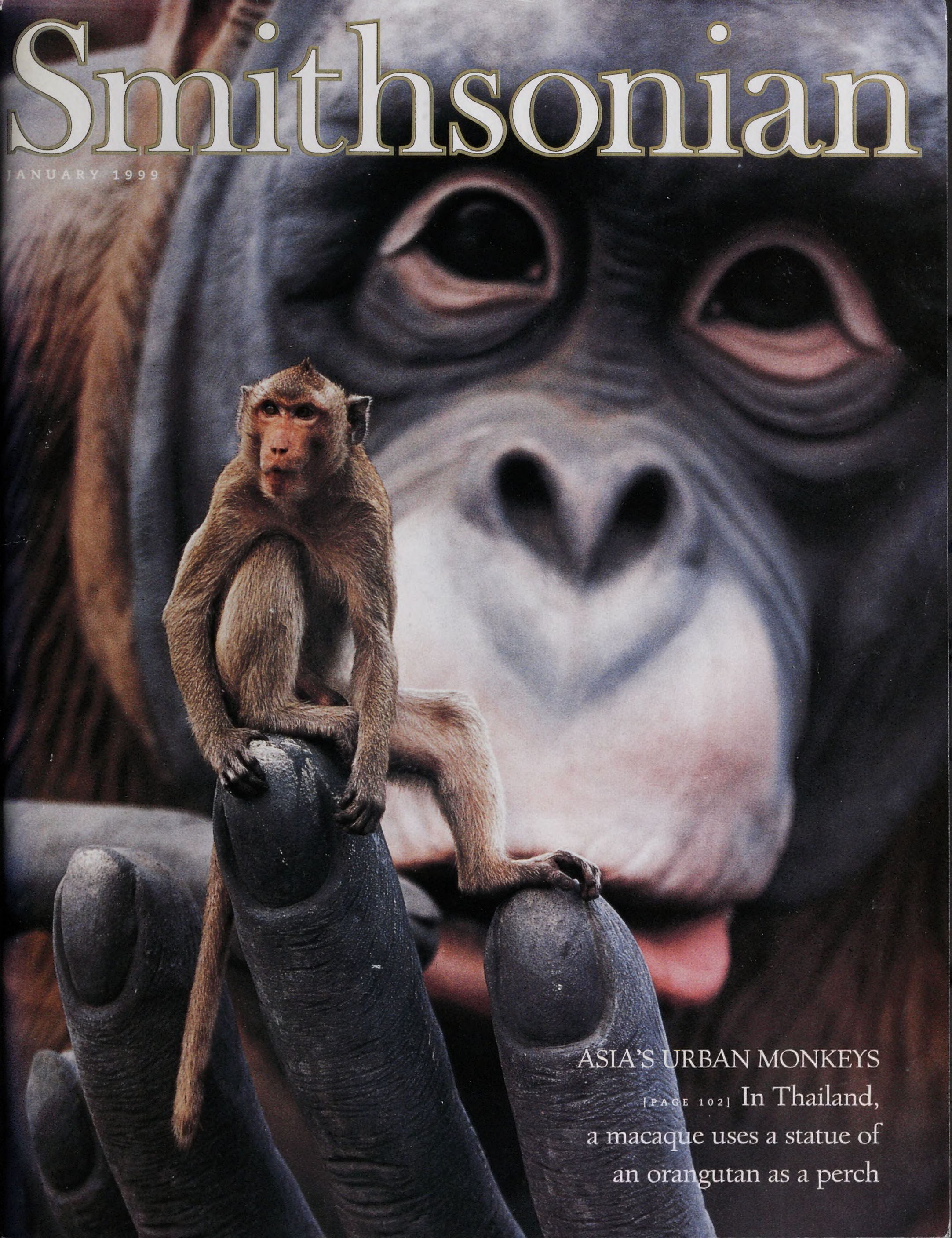
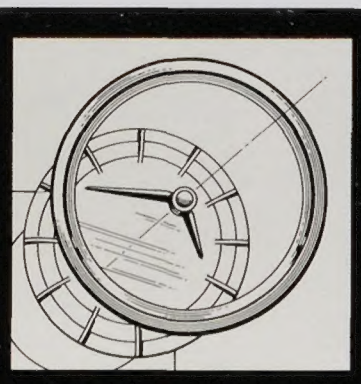


ASIA'S URBAN MONKEYS

[PAGE 102] In Thailand, a macaque uses a statue of an orangutan as a perch



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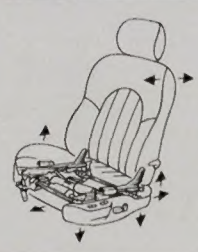

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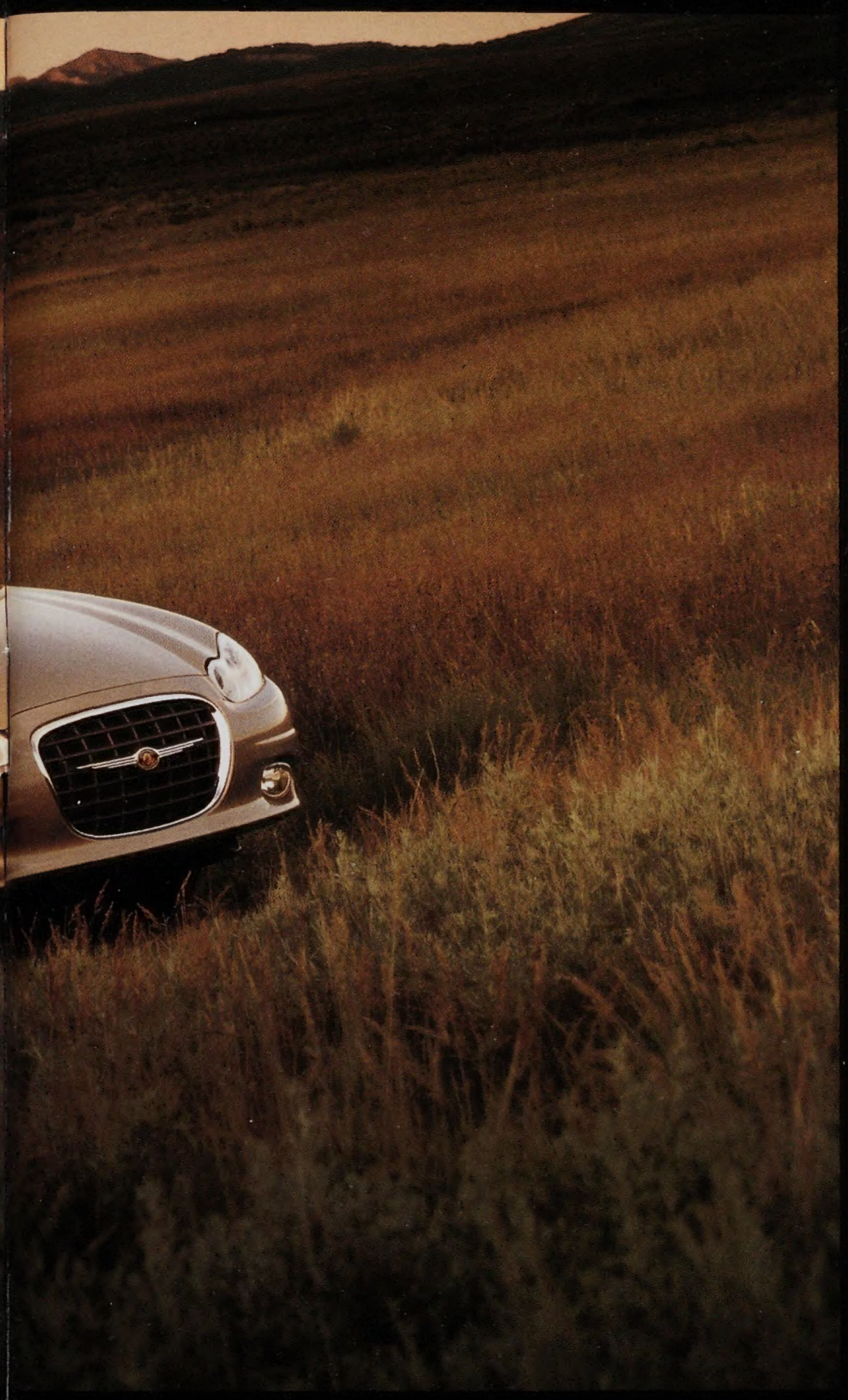

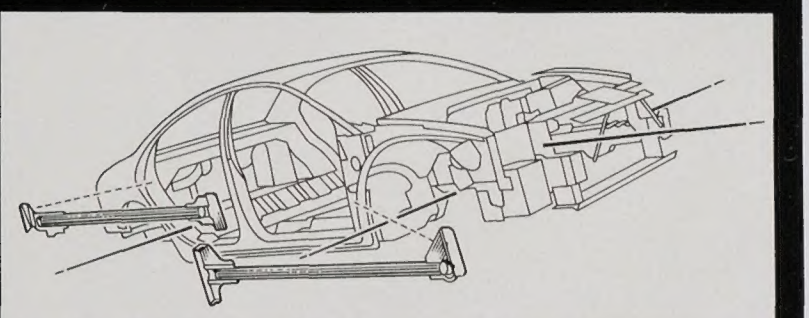

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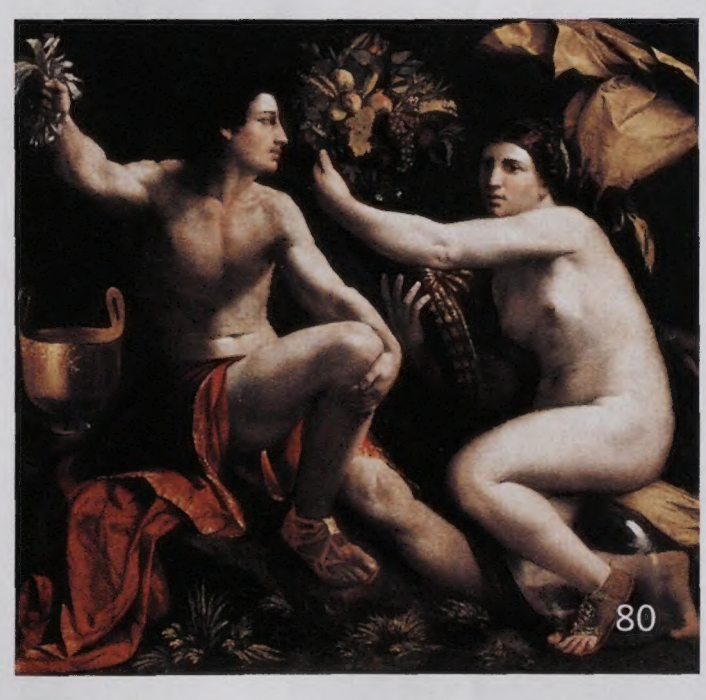

46 Casting a High-Tech Net for Space Trash
Debris from old missions—booster rockets, bolts, camera lens caps—poses a serious threat to spacecraft orbiting our planet
BY JAMES R. CHILES ♜ PHOTOGRAPHS BY KAY CHERNUSH

56 The Changing Face of Stone Mountain
Home to the Confederate Mount Rushmore, the Georgia town, once a bastion of the Klan, is carving out a new identity
BY MINNA MORSE ♜ PHOTOGRAPHS BY MAGGIE STEBER

70 Salt of the Earth
Over the centuries, sodium chloride, now cheap and abundant, has fueled wars and riots—and made a lot of food more tasty
BY STEVE KEMPER

80 Dosso Dossi: A Renaissance Artist Comes to Light
The ducal courts of 16th-century Ferrara were famed for their splendor; now, works by a favorite painter show why
BY BENNETT SCHIFF

90 Crash, Slam, Boom!
In the demolition derby, a novice driver discovers, cunning and courage can be as important as your car—well, almost
BY RICHARD CONNIFF ♜ PHOTOGRAPHS BY JOE MCNALLY

102 When Monkeys Move to Town
Loitering on sidewalks and begging at shops, macaques are familiar, but not always welcome, sights in cities across Asia
PHOTOGRAPHS BY JIM LEACHMAN

110 Who *Are* Those Guys?
Their faces peer from an 1859 photograph often published in films, books and newspapers—but rarely with the right facts
BY RALPH GRAVES

112 An "Odd Fish" Who Swam Against the Tide
Constantine Rafinesque first described some 100 species, but perhaps the most unusual of all was the man himself
BY BIL GILBERT

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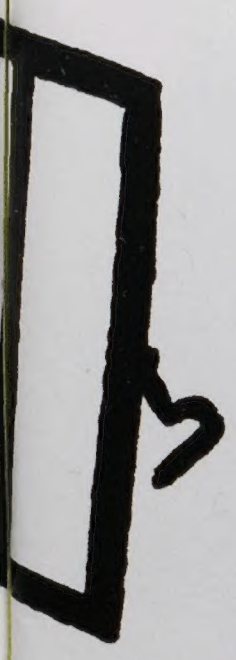

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departments

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Cover A young long-tailed macaque, poised on the fingers of an orangutan statue in Lop Buri, Thailand, appears to contemplate his place in the scheme of things. The ten-foot-high statue is one of dozens erected by a local inn to honor the world's monkeys.
PHOTOGRAPH BY JIM LEACHMAN

16 Letters to the Editor

132 Additional Sources

134 Smithsonian Study Tours

14 Smithsonian Perspectives
Expanding a Mission
BY SECRETARY I. MICHAEL HEYMAN

22 Phenomena, Comment & Notes
Ailing? Just Add Cells
BY JOHN P. WILEY, JR.

30 Around the Mall & Beyond
Trailing the Big Cats
BY MICHAEL KERNAN

34 The Object at Hand
Picturing Pocahontas
BY JOHN F. ROSS

38 Smithsonian Highlights
Portraiture as Head Game
Highlights Calendar starts on page 40

126 Book Reviews
The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century's On-Line Pioneers by Tom Standage
The Great Hill Stations of Asia by Barbara Crossette

136 The Last Page
"Let's Get Dale to Play!"
BY BRUCE WATSON

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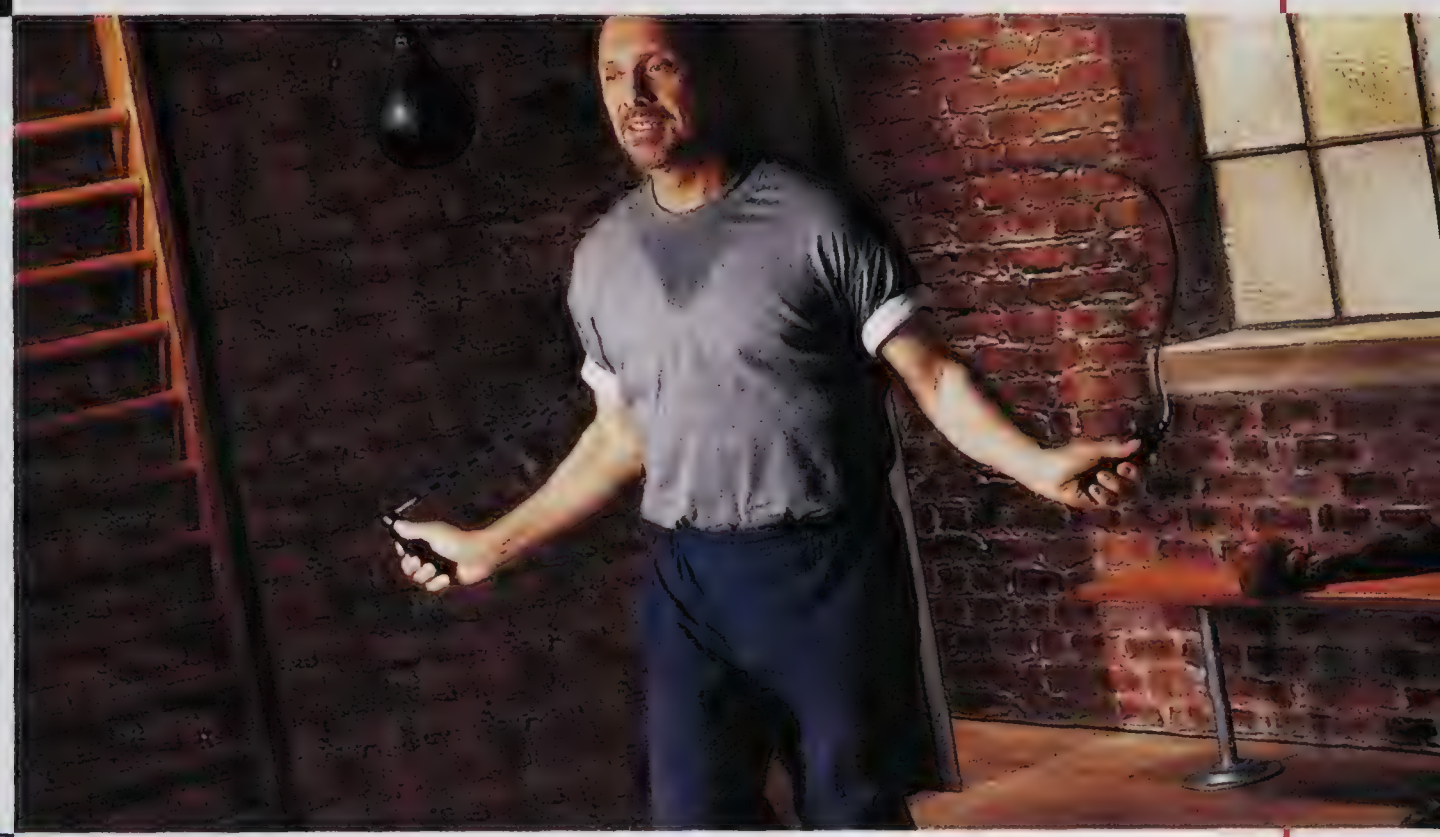

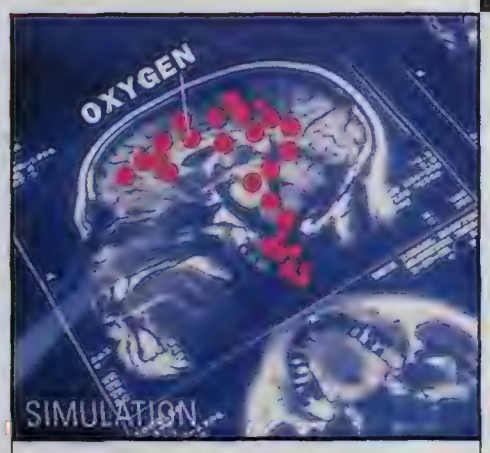

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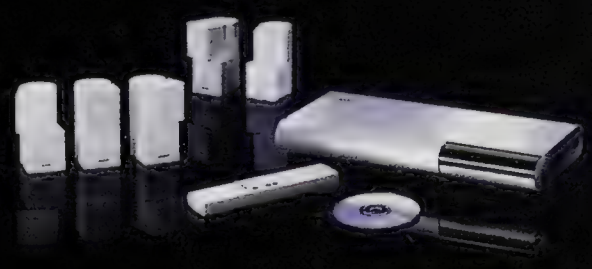

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SMITHSONIAN

PERSPECTIVES

Expanding a Mission

THE NATIONAL MUSEUM OF NATURAL HISTORY AIMS TO BECOME A HUB FOR SCIENCE EDUCATION

THE NATIONAL MUSEUM OF NATURAL HISTORY IS ONE OF the Smithsonian's oldest facilities (it opened in 1910) and one of its most visited. It is dedicated to exhibitions and public programs and has extensive collections of flora and fauna as well as gems and other minerals, vast anthropological records and cultural objects. Yet the museum is more than a place for collections and exhibitions. It is a center for scientific research and education whose impact increasingly reaches well beyond its walls.

The museum has three major missions. First, it is a huge collection center for natural materials—more than a hundred million objects arranged systematically and available for research and exhibition. This archive is one of the most extensive in the world and is continually enriched by ongoing research. The immensity of the collection, for instance, permits in-depth study of conditions of the earth over geologic time. Currently, a museum paleobiologist is studying the events that led to the massive extinction of most species on earth some 250 million years ago.

A second mission of the museum is education. Exhibitions are at the core of Natural History's education program, and the museum has some splendid ones. The new Janet Annenberg Hooker Hall of Geology, Gems and Minerals (supported primarily by private gifts) is a great example. Education, especially for children, is enhanced by opportunities for participation. At the museum's Insect Zoo children can observe, touch and commune with exotic insects. Plans for the west wing (under renovation) include a Discovery Room that will allow children hands-on experiences with museum artifacts. Other new exhibitions are on the way, most notably a renovated Africa Hall and innovative presentations of mammals. Still, however, there are many exhibitions that need modernization.

A third goal is research, scholarship and public service. The museum's scientists study biodiversity, participate in conservation efforts, conduct archaeological digs (many involving early human habitation in the Americas), carry on anthropological research, keep track of the world's volcanoes, and study plate tectonics and a score of other subjects.

Today, on the verge of a new century, the Natural History museum is working to expand its role from being a well-loved destination for visitors to serving as the hub of a national network for science education.

Last fall, for instance, six school districts around the United States began testing a program to promote museum-style, object-based learning in middle-school science classes. Supported with funds from the $20 million Behring Family Gift, Mammals in the Schools will provide each school with a mammal specimen, an electronic classroom with two-way videoconferencing links to the museum and an exhibitions lab. With their teachers and museum scientists, students will analyze their mammal's physical structure, study its habitat and the resources it needed to live, and describe its place within a larger ecosystem. Then they will design and build an exhibition to share what they have learned with their parents and community. Teachers working with museum scientists will develop a curriculum using software created for the project by IBM.

A second program funded by the Behring Gift, Mammals on the Move, will produce small exhibits for display in settings such as libraries, airports and shopping malls. These dioramas of mammals in their habitats, supported by illustrations, photographs, videos and take-home brochures, are designed to encourage people to look closely at the natural world and think about its complexity.

Other initiatives helping transform the museum into a learning hub include electronic field trips that simultaneously link several classrooms to museum science labs via videoconferencing equipment. Also in the works is an Institution-wide project to make three-dimensional, rotatable images of objects in Smithsonian collections—the vast majority of which are natural history specimens—available on the World Wide Web.

The museum is actively seeking resources needed for extensive renovation of exhibitions, for fellowships to increase the participation of college students, for expansion of research capabilities and a host of other objectives.

The federal government pays the basic bills for operations and maintenance. These other needs must largely be met by private funds. The National Museum of Natural History is a major player as we plan for a Smithsonian-wide fundraising campaign.

I. MICHAEL HEYMAN, SECRETARY

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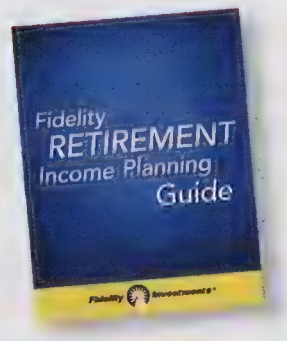

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DAM REMOVAL

AS A NATIVE NORTHWESTERNER, I WAS most interested in Patrick Joseph's article "The Battle of the Dams" in the November issue. When the gates were closed on the Dalles Dam on the Columbia River in the mid-1950s, I shared the sorrow of the Native Americans who lost a significant part of their lives, their culture and their livelihood as the new reservoir engulfed their great fishing grounds at Celilo Falls.

But I am also curious why so little has been said about the third great purpose (after hydropower and navigation) for damming our rivers: flood control. One of my earliest memories was of my father coming home in the predawn darkness after having spent most of the night sandbagging along the river during the Memorial Day flood of 1948. That disaster wiped out the entire city of Vanport near Portland and damaged several other riverside towns.

I don't like dams, but the alternative involves teaching the human race that building in a floodplain is not smart. After centuries of progress, that lesson has yet to be learned.

Tom Rice
Moscow, Idaho

ANOTHER DAM FOR THE LIST OF those that should be removed is the O'Shaughnessy Dam in Hetch Hetchy Valley in Yosemite National Park. The first president of the Sierra Club, John Muir, called the Hetch Hetchy Valley a "wonderfully exact counterpart" of Yosemite Valley and "one of nature's rarest and most precious mountain temples." Following a fierce national debate that was led by Muir, the U.S. Congress authorized the city of San Francisco, in the Raker Act of 1913, to construct a dam and reservoir on the Tuolumne River in Hetch Hetchy. The O'Shaughnessy Dam was completed in 1923, and shortly thereafter, San Francisco began using the Hetch Hetchy for its water supply and electric power generation.

In 1987, Secretary of the Interior Donald Hodel proposed the restoration of Hetch Hetchy Valley. The Sierra Club's board of directors reaffirmed its opposition to the damming of the Tuolumne River and called upon "all interests to study and assess alternatives to meeting their needs and concerns through alternative sources of water, power and revenues." A 1988 report prepared by the Bureau of Reclamation for the National Park Service stated: "Such restoration would renew the national commitment to maintaining the integrity of the national park system and keep in perpetual conservation an irreplaceable and unique natural area."

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Ron Good, Chair
Sierra Club
Hetch Hetchy Restoration Task Force
Yosemite, California

WHILE FORMALLY BALANCED, YOUR article lacked perspective and, therefore, clarity. By focusing solely on controversy, you did not tell your readers about the more than 75,000 productive dams in the United States, most of which are used for recreation, followed by fire and farm ponds, flood control and water supply.

Overlooked in your piece is hydropower's greatest environmental benefit: producing energy without harmful air pollutants. In 1996, hydropower displaced 327 million tons of carbon dioxide that could have been released into the atmosphere.

Both dams and healthy rivers can coexist, and dams can create more biodiversity. Reservoirs behind dams can be teeming with life, including both anadromous and resident fish that depend on reservoirs for survival. Often, wildlife preserves associated with reservoirs provide stable habitats for endangered or threatened species.

Leaving rivers natural and undeveloped is one way to value them. But there are many other reasons to value them: navigation, irrigation, recreation, flood management. At another level they support local economies and provide meaningful employment, and clean and renewable electricity from hydropower. Rather than damning dams, we should figure out how to maximize a river's societal benefit by making choices that will balance the competing values.

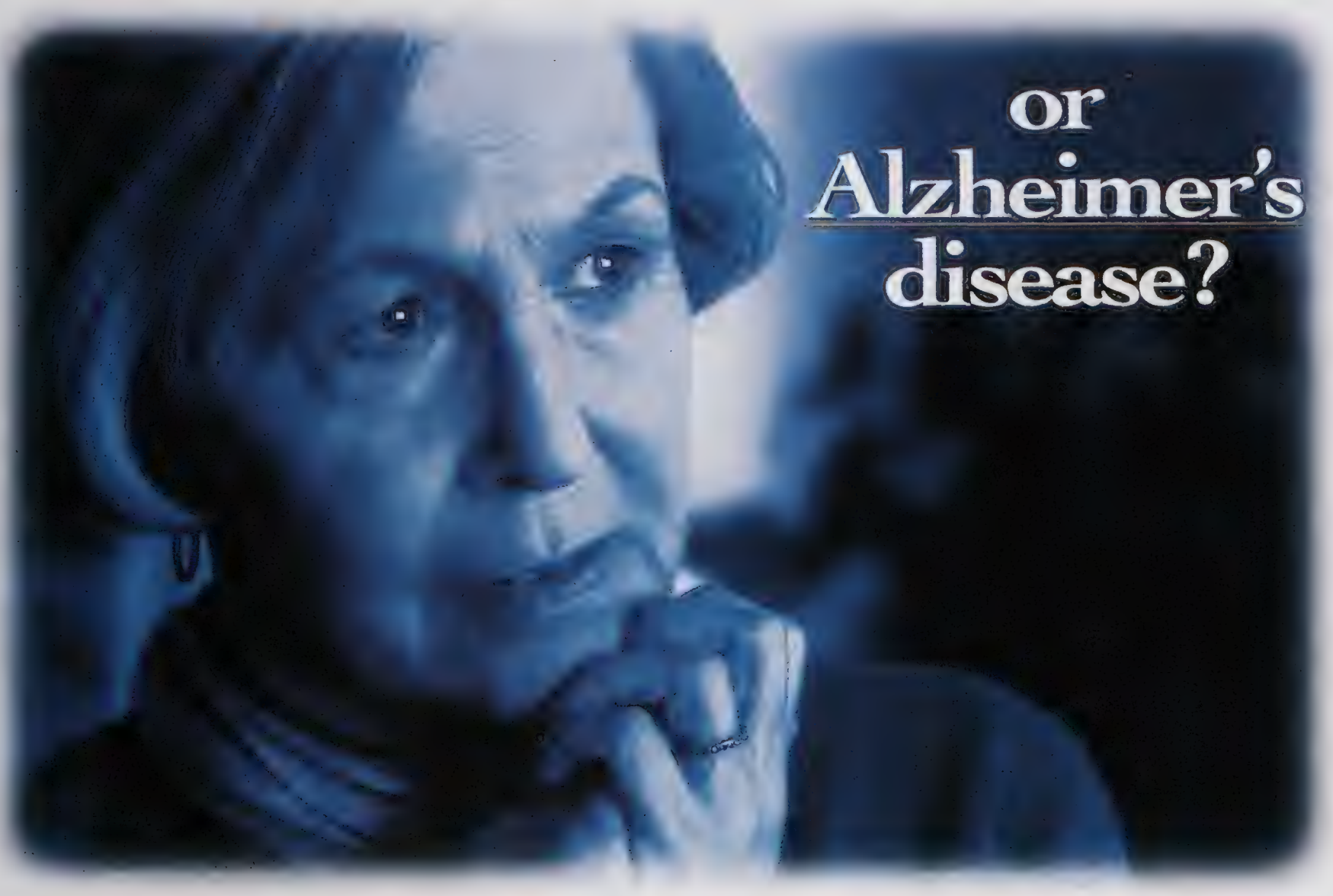
Linda Church Ciocci
Executive Director
National Hydropower Association
Washington, D.C.

SMALL-TOWN POLICE

IN HIS ARTICLE ABOUT SMALL-TOWN police, Richard Wolkomir described an early morning call to the Montpelier, Vermont, police department that Sgt. John Martin answered. A forty-something woman had hit a deer with her car, and the impact had badly maimed the animal. Sergeant Martin shot the deer, ending its suffering. The woman narrowed her eyes and demanded, "How does that make you feel?"

As a state law enforcement officer, I can describe how you feel. You swallow your feelings at killing an animal at close range, at finishing what she started. You suppress your fear that the wounded animal might kick out as you approach, injuring or killing you with its hoof. You work to make sure that the shot is true and does the job the first time so that the bullet doesn't exit the deer, ricochet and hurt or kill you or the woman. And when the woman lashes out at you

Is it just forgetfulness...



• Memory loss • Asking repeated questions • Trouble using words

When signs like these begin to affect everyday life, they may not be a part of normal aging. They may be signs of Alzheimer's disease, an incurable, progressive illness that robs patients and their families of a lifetime of memories.

Today, however, the outlook for many is becoming more hopeful. ARICEPT® is a clinically proven, once-a-day prescription medicine available to treat symptoms in patients with mild to moderate Alzheimer's disease. Already, over 400,000 patients in the United States have begun ARICEPT® therapy.

ARICEPT® is well tolerated, but some people do experience side effects like nausea, diarrhea, insomnia, vomiting, muscle cramps, fatigue, and loss of appetite. In clinical studies, these effects were generally mild, temporary, and went away with continued ARICEPT® use; 2% of people taking ARICEPT® experienced fainting.

Only a doctor can evaluate symptoms such as forgetfulness and diagnose Alzheimer's disease. Speak to a doctor *today* about the benefits of ARICEPT® in treating Alzheimer's disease.

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ARICEPT®
(donepezil HCl)
5-MG AND 10-MG TABLETS

TODAY'S TREATMENT FOR ALZHEIMER'S DISEASE

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Please see additional important product information on accompanying page.

People at risk for ulcers should inform their doctor.

ONCE-A-DAY
ARICEPT® (donepezil HCl) 5-MG AND 10-MG TABLETS
TODAY'S TREATMENT FOR ALZHEIMER'S DISEASE

ARICEPT® (Donepezil Hydrochloride Tablets)
Brief Summary—see package insert for full prescribing information. **INDICATIONS AND USAGE** ARICEPT® is indicated for the treatment of mild to moderate dementia of the Alzheimer's type. **CONTRAINDICATIONS** ARICEPT® is contraindicated in patients with known hypersensitivity to donepezil hydrochloride or to piperidine derivatives. **WARNINGS** ***Anesthesia:*** ARICEPT®, as a cholinesterase inhibitor, is likely to exaggerate succinylcholine-type muscle relaxation during anesthesia. ***Cardiovascular Conditions:*** Because of their pharmacological action, cholinesterase inhibitors may have vagotonic effects on heart rate (eg, bradycardia). The potential for this action may be particularly important to patients with "sick sinus syndrome" or other supraventricular cardiac conduction conditions. Syncopal episodes have been reported in association with the use of ARICEPT®. ***Gastrointestinal Conditions:*** Through their primary action, cholinesterase inhibitors may be expected to increase gastric acid secretion due to increased cholinergic activity. Therefore, patients should be monitored closely for symptoms of active or occult gastrointestinal bleeding, especially those at increased risk for developing ulcers, eg, those with a history of ulcer disease or those receiving concurrent nonsteroidal anti-inflammatory drugs (NSAIDS). Clinical studies of ARICEPT® have shown no increase, relative to placebo, in the incidence of either peptic ulcer disease or gastrointestinal bleeding. ARICEPT®, as a predictable consequence of its pharmacological properties, has been shown to produce diarrhea, nausea, and vomiting. These effects, when they occur, appear more frequently with the 10 mg/day dose than with the 5 mg/day dose. In most cases, these effects have been mild and transient, sometimes lasting one to three weeks, and have resolved during continued use of ARICEPT®. ***Genitourinary:*** Although not observed in clinical trials of ARICEPT®, cholinomimetics may cause bladder outflow obstruction. ***Neurological Conditions:*** Seizures: Cholinomimetics are believed to have some potential to cause generalized convulsions. However, seizure activity also may be a manifestation of Alzheimer's Disease. ***Pulmonary Conditions:*** Because of their cholinomimetic actions, cholinesterase inhibitors should be prescribed with care to patients with a history of asthma or obstructive pulmonary disease. **PRECAUTIONS Drug-Drug Interactions** ***Drugs Highly Bound to Plasma Proteins:*** Drug displacement studies have been performed *in vitro* between this highly bound drug (96%) and other drugs such as furosemide, digoxin, and warfarin. ARICEPT® at concentrations of 0.3-10 µg/mL did not affect the binding of furosemide (5 µg/mL), digoxin (2 ng/mL), and warfarin (3 µg/mL) to human albumin. Similarly, the binding of ARICEPT® to human albumin was not affected by furosemide, digoxin and warfarin. ***Effect of ARICEPT® on the Metabolism of Other Drugs:*** No *in vivo* clinical trials have investigated the effect of ARICEPT® on the clearance of drugs metabolized by CYP 3A4 (eg, cisapride, terfenadine) or by CYP 2D6 (eg, imipramine). However, *in vitro* studies show a low rate of binding to these enzymes (mean K_i about 50 -130 µM), that, given the therapeutic plasma concentrations of donepezil (164 nM), indicates little likelihood of interference. Whether ARICEPT® has any potential for enzyme induction is not known. Formal pharmacokinetic studies evaluated the potential of ARICEPT® for interaction with theophylline, cimetidine, warfarin and digoxin. No significant effects on the pharmacokinetics of these drugs were observed. ***Effect of Other Drugs on the Metabolism of ARICEPT®:*** Ketoconazole and quinidine, inhibitors of CYP450, 3A4 and 2D6, respectively, inhibit donepezil metabolism *in vitro*. Whether there is a clinical effect of these inhibitors is not known. Inducers of CYP 2D6 and CYP 3A4 (eg, phenytoin, carbamazepine, dexamethasone, rifampin, and phenobarbital) could increase the rate of elimination of ARICEPT®. Formal pharmacokinetic studies demonstrated that the metabolism of ARICEPT® is not significantly affected by concurrent administration of digoxin or cimetidine. ***Use with Anticholinergics:*** Because of their mechanism of action, cholinesterase inhibitors have the potential to interfere with the activity of anticholinergic medications. ***Use with Cholinomimetics and Other Cholinesterase Inhibitors:*** A synergistic effect may be expected when cholinesterase inhibitors are given concurrently with succinylcholine, similar neuromuscular blocking agents or cholinergic agonists such as bethanechol. **Carcinogenesis, Mutagenesis, Impairment of Fertility** Carcinogenicity studies of donepezil have not been completed. Donepezil was not mutagenic in the Ames reverse mutation assay in bacteria. In the chromosome aberration test in cultures of Chinese hamster lung (CHL) cells, some clastogenic effects were observed. Donepezil was not clastogenic in the *in vivo* mouse micronucleus test. Donepezil had no effect on fertility in rats at doses up to 10 mg/kg/day (approximately 8 times the maximum recommended human dose on a mg/m² basis). **Pregnancy** *Pregnancy Category C:* Teratology studies conducted in pregnant rats at doses up to 16 mg/kg/day (approximately 13 times the maximum recommended human dose on a mg/m² basis) and in pregnant rabbits at doses up to 10 mg/kg/day (approximately 16 times the maximum recommended human dose on a mg/m² basis) did not disclose any evidence for a teratogenic potential of donepezil. However, in a study in which pregnant rats were given up to 10 mg/kg/day (approximately 8 times the maximum recommended human dose on a mg/m² basis) from day 17 of gestation through day 20 postpartum, there was a slight increase in still births and a slight decrease in pup survival through day 4 postpartum at this dose; the next lower dose tested was 3 mg/kg/day. There are no adequate or well-controlled studies in pregnant women. ARICEPT® should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. **Nursing Mothers** It is not known whether donepezil is excreted in human breast milk. ARICEPT® has no indication for use in nursing mothers. **Pediatric Use** There are no adequate and well-controlled trials to document the safety and efficacy of ARICEPT® in any illness occurring in children. **ADVERSE REACTIONS Adverse Events Leading to Discontinuation** The rates of discontinuation from controlled clinical trials of ARICEPT® due to adverse events for the ARICEPT® 5 mg/day treatment groups were comparable to those of placebo-treatment groups at approximately 5%. The rate of discontinuation of patients who received 7-day escalations from 5 mg/day to 10 mg/day, was higher at 13%. The most common adverse events leading to discontinuation, defined as those occurring in at least 2% of patients and at twice the incidence seen in placebo patients were nausea (1% [5 mg] and 3% [10 mg] vs 1% [placebo]), diarrhea (<1% [5 mg] and 3% [10 mg] vs 0% [placebo]), and vomiting (<1% [5 mg] and 2% [10 mg] vs <1% [placebo]). **Most Frequent Adverse Clinical Events Seen in Association with the Use of ARICEPT®** The most common adverse events, defined as those occurring at a frequency of at least 5% in patients receiving 10 mg/day and twice the placebo rate, are largely predicted by ARICEPT®'s cholinomimetic effects. These include nausea, diarrhea, insomnia, vomiting, muscle cramp, fatigue, and anorexia. These adverse events were often of mild intensity and transient, resolving during continued ARICEPT® treatment without the need for dose modification. There is evidence to suggest that the frequency of these common adverse events may be affected by the rate of titration. An open-label study was conducted with 269 patients who received placebo in the 15- and 30-week studies. These patients were titrated to a dose of 10 mg/day over a 6-week period. The rates of common adverse events were lower than those seen in patients titrated to 10 mg/day over one week in the controlled clinical trials and were comparable to those seen in patients on 5 mg/day. See Table 1 for a comparison of the most common adverse events following one week and six week titration regimens. **Adverse Events Reported in Controlled Trials** The events cited reflect experience gained under closely monitored conditions of clinical trials in a highly selected patient population. In actual clinical practice or in other clinical trials, these frequency estimates may not apply, as the conditions of use, reporting behavior, and the kinds of patients treated may differ. Table 2 lists treatment emergent signs and symptoms that were reported in at least 2% of patients in placebo-controlled trials who received ARICEPT® and for which the rate of occurrence was greater for ARICEPT® assigned than placebo assigned patients. In general, adverse events occurred more frequently in female patients and with advancing age. **Other Adverse Events Observed During Clinical Trials** ARICEPT® has been administered to over 1700 individuals during clinical trials worldwide. Approximately 1200 of these patients have been treated for at least 3 months and more than 1000 patients have been treated for at least 6 months. Controlled and uncontrolled trials in the United States included approximately 900 patients. In regards to the highest dose of 10 mg/day, this population includes 650 patients treated for 3 months, 475 patients treated for 6 months and 116 patients treated for over 1 year. The range of patient exposure is from 1 to 1214 days. Treatment emergent signs and symptoms that occurred during 3 controlled clinical trials and two open-label trials in the United States were recorded as adverse events by the clinical investigators using terminology of their own choosing. To provide an overall estimate of the proportion of individuals having similar types of events, the events were grouped into a smaller number of standardized categories using a modified COSTART dictionary and event frequencies were calculated across all studies. These categories are used in the listing below. The frequencies represent the proportion of 900 patients from these trials who experienced that event while receiving ARICEPT®. All adverse events occurring at least twice are included, except for those already listed in Tables 1 or 2, COSTART terms too general to be informative, or events less likely to be drug caused. Events are classified by body system and listed using the following definitions: *frequent adverse events*—those occurring in at least 1/100 patients; *infrequent adverse events*—those occurring in 1/100 to 1/1000 patients. These adverse events are not necessarily related to ARICEPT® treatment and in most cases were observed at a similar frequency in placebo-treated patients in the controlled studies. No important additional adverse events were seen in studies conducted outside the United States. **Body as a Whole:** *Frequent:* influenza, chest pain, toothache; *Infrequent:* fever, edema face, periorbital edema, hernia hiatal, abscess, cellulitis, chills, generalized coldness, head fullness, listlessness. **Cardiovascular System:** *Frequent:* hypertension, vasodilation, atrial fibrillation, hot flashes, hypotension; *Infrequent:* angina pectoris, postural hypotension, myocardial infarction, AV block (first degree), congestive heart failure, arteritis, bradycardia, peripheral vascular disease, supraventricular tachycardia, deep vein thrombosis. **Digestive System:** *Frequent:* fecal incontinence, gastrointestinal bleeding, bloating, epigastric pain; *Infrequent:* eructation, gingivitis, increased appetite, flatulence, periodontal abscess, cholelithiasis, diverticulitis, drooling, dry mouth, fever sore, gastritis, irritable colon, tongue edema, epigastric distress, gastroenteritis, increased transaminases, hemorrhoids, ileus, increased thirst, jaundice, melena, polydypsia, duodenal ulcer, stomach ulcer. **Endocrine System:** *Infrequent:* diabetes mellitus, goiter. **Hemic and Lymphatic System:** *Infrequent:* anemia, thrombocythemia, thrombocytopenia, eosinophilia, erythrocytopenia. **Metabolic and Nutritional Disorders:** *Frequent:* dehydration; *Infrequent:* gout, hypokalemia, increased creatine kinase, hyperglycemia, weight increase, increased lactate dehydrogenase. **Musculoskeletal System:** *Frequent:* bone fracture; *Infrequent:* muscle weakness, muscle fasciculation. **Nervous System:** *Frequent:* delusions, tremor, irritability, paresthesia, aggression, vertigo, ataxia, increased libido, restlessness, abnormal crying, nervousness, aphasia; *Infrequent:* cerebrovascular accident, intracranial hemorrhage, transient ischemic attack, emotional lability, neuralgia, coldness (localized), muscle spasm, dysphoria, gait abnormality, hypertonia, hypokinesia, neurodermatitis, numbness (localized), paranoia, dysarthria, dysphasia, hostility, decreased libido, melancholia, emotional withdrawal, nystagmus, pacing. **Respiratory System:** *Frequent:* dyspnea, sore throat, bronchitis; *Infrequent:* epistaxis, postnasal drip, pneumonia, hyperventilation, pulmonary congestion, wheezing, hypoxia, pharyngitis, pleurisy, pulmonary collapse, sleep apnea, snoring. **Skin and Appendages:** *Frequent:* pruritus; diaphoresis, urticaria; *Infrequent:* dermatitis, erythema, skin discoloration, hyperkeratosis, alopecia, fungal dermatitis, herpes zoster, hirsutism, skin striae, night sweats, skin ulcer. **Special Senses:** *Frequent:* cataract, eye irritation, vision blurred; *Infrequent:* dry eyes, glaucoma, earache, tinnitus, blepharitis, decreased hearing, retinal hemorrhage, otitis externa, otitis media, bad taste, conjunctival hemorrhage, ear buzzing, motion sickness, spots before eyes. **Urogenital System:** *Frequent:* urinary incontinence, nocturia; *Infrequent:* dysuria, hematuria, urinary urgency, metrorrhagia, cystitis, enuresis, prostate hypertrophy, pyelonephritis, inability to empty bladder, breast fibroadenosis, fibrocystic breast, mastitis, pyuria, renal failure, vaginitis. **Postintroduction Reports** Voluntary reports of adverse events temporally associated with ARICEPT® that have been received since market introduction that are not listed above, and that there is inadequate data to determine the causal relationship with the drug include the following: abdominal pain, agitation, cholecystitis, confusion, convulsions, hallucinations, hemolytic anemia, pancreatitis, and rash. **OVERDOSAGE Because strategies for the management of overdose are continually evolving, it is advisable to contact a Poison Control Center to determine the latest recommendations for the management of an overdose of any drug.** As in any case of overdose, general supportive measures should be utilized. Overdosage with cholinesterase inhibitors can result in cholinergic crisis characterized by severe nausea, vomiting, salivation, sweating, bradycardia, hypotension, respiratory depression, collapse and convulsions. Increasing muscle weakness is a possibility and may result in death if respiratory muscles are involved. Tertiary anticholinergics such as atropine may be used as an antidote for ARICEPT® overdosage. Intravenous atropine sulfate titrated to effect is recommended: an initial dose of 1.0 to 2.0 mg IV with subsequent doses based upon clinical response. Atypical responses in blood pressure and heart rate have been reported with other cholinomimetics when co-administered with quaternary anticholinergics such as glycopyrrolate. It is not known whether ARICEPT® and/or its metabolites can be removed by dialysis (hemodialysis, peritoneal dialysis, or hemofiltration). Dose-related signs of toxicity in animals included reduced spontaneous movement, prone position, staggering gait, lacrimation, clonic convulsions, depressed respiration, salivation, miosis, tremors, fasciculation and lower body surface temperature. **DOSAGE AND ADMINISTRATION** The dosages of ARICEPT® shown to be effective in controlled clinical trials are 5 mg and 10 mg administered once per day. Controlled clinical trials indicate that the 10 mg dose, with a one week titration, is likely to be associated with a higher incidence of cholinergic adverse events than the 5 mg dose. Because steady state is not achieved for 15 days and because the incidence of such effects may be influenced by the rate of dose escalation, treatment with a dose of 10 mg should not be contemplated until patients have been on a daily dose of 5 mg for 4 to 6 weeks. Whether or not to employ a dose of 10 mg is a matter of prescriber and patient preference. ARICEPT® should be taken in the evening, just prior to retiring, and may be taken with or without food.

Table 1. Comparison of Rates of Adverse Events in Patients Titrated to 10 mg/day Over 1 and 6 Weeks

	No titration		One-week titration	Six-week titration
Adverse Event	Placebo (n=315)	5 mg/day (n=311)	10 mg/day (n=315)	10 mg/day (n=269)
Nausea	6%	5%	19%	6%
Diarrhea	5%	8%	15%	9%
Insomnia	6%	6%	14%	6%
Fatigue	3%	4%	8%	3%
Vomiting	3%	3%	8%	5%
Muscle Cramps	2%	6%	8%	3%
Anorexia	2%	3%	7%	3%

Table 2. Adverse Events Reported in Controlled Clinical Trials in at Least 2% of Patients Receiving ARICEPT® and at a Higher Frequency Than Placebo-treated Patients

Body System/Adverse Event	Placebo (n=355)	ARICEPT® (n=747)
Percent of Patients With Any Adverse Event	72	74
Body as a Whole		
Headache	9	10
Pain, Various Locations	8	9
Accident	6	7
Fatigue	3	5
Cardiovascular System		
Syncope	1	2
Digestive System		
Nausea	6	11
Diarrhea	5	10
Vomiting	3	5
Anorexia	2	4
Hemic and Lymphatic System		
Ecchymosis	3	4
Metabolic and Nutritional Systems		
Weight Decrease	1	3
Musculoskeletal System		
Muscle Cramps	2	6
Arthritis	1	2
Nervous System		
Insomnia	6	9
Dizziness	6	8
Depression	<1	3
Abnormal Dreams	0	3
Somnolence	<1	2
Urogenital System		
Frequent Urination	1	2

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for something she had a hand in, you swallow again and let her vent. A dozen responses run through your head, some rational, some snappy, that you never verbalize.

You look at that incident and combine it with all of the others in the article, and you realize why cops have such high rates of health and personal problems. Me, I admire Sergeant Martin. He had to look the deer in the eye, something the woman could not muster the courage to do herself.

Capt. Bruce Bugg
Atlanta, Georgia

YOUR ARTICLE DESCRIBED AN INCIdent in which two young men fell out of their canoe into an icy river. One man drowned, and Sgt. John Martin risked his life by jumping into the icy river to save the other. Neither the canoeist nor his family ever said thank you.

Sergeant Martin—and all of the other police officers across the country—please accept my thanks for your daily heroic efforts in protecting my life and property. You put your lives on the line to maintain the peaceful functioning of our society. We all owe you not only our respect but also a debt of gratitude.

Cynthia C. Miller
Mechanicsburg, Pennsylvania

OLD NEWSPAPERS

THE TITLE OF EUGENE L. MEYER'S article "Old News Is Good News" is not entirely correct. Private collectors of historical manuscripts and printed materials are responsible for saving many valuable resources for use by historians and genealogists, but hobbies such as collecting significant old newspapers have also resulted in the theft of many such items from public archives and libraries. Your article especially reminded me of my fruitless search for issues of the colonial Georgia newspaper the *Royal Georgia Gazette*. A bibliography published in the 1940s led me to several institutions, including the British Library, that supposedly had those issues that are not available on microfilm. In every instance, thieves had gotten there first.

Robert Scott David, Jr.
Hanceville, Alabama

MUSCLE BEACH

KEN CHOWDER DID A FINE JOB RE-searching his article on Muscle Beach. I grew up near Venice, California, and as a lad, I used to watch the men working out at Muscle Beach. They would walk over and talk to us kids, and flex their muscles because we loved it. They were heroic figures for us, and they knew it. It was those memories that inspired me to become a bodybuilder as an adult. Most men today aren't motivated by heroism and personal challenge or to be "well built." They grow bodies that are freakishly huge in order to garner respect. Perhaps this is a small metaphor for how one gets ahead in society today: not by art and sacrifice but by intimidation.

R. Christian Anderson
Escondido, California

I HAD JUST RETURNED FROM MY father's funeral and sat down with SMITHSONIAN. It fell open to your great picture of him holding Paula Unger on his shoulders on page 124. On page 128, he is the behatted "burly pitcher." His name was Ransom Palmer Hall. He became a stuntman for Universal Studios while attending the University of Southern California. At USC he went on to become captain of the gymnastics team and was inducted into their Athletic Hall of Fame.

Nan Liner
Alexandria, Virginia

THE LAST PAGE

KEN BUDD'S ESSAY "THE HIT PARADE from Hell" was so on target. Many mornings I have awakened with some irritating song or an advertising jingle running through my head. Not long ago I drove a short distance with my daughter who was playing a tape of a song called "Soul to Squeeze." At least that's what it sounded like. I wandered around with random verses invading my mind, belting out "where I go, I just doooooooonnnnn't know." My cats stared. Thanks to Mr. Budd, "Soul to Squeeze" no longer plagues me. It has been replaced by the song in his essay, "The Devil Went Down to Georgia."

Lynda R. Johnson
Mandan, North Dakota

I AM A VETERINARIAN, AND ONE REgrettably memorable tune for me is "The Cat Got Dead" by comedian Heywood Banks. Once, after I had finally managed to dump it from my brain after a long, annoying run, my musician boyfriend called and sang it into my answering machine.

A worse tune has replaced it. I chanced upon a children's show that had a toothsome puppet singing "I am a beaver, I'm an achiever, and I do and I do and I do build a dam." It has morphed to include lyrics about dog breeds in general ("I'm a Jack Russell, I love a tussle").

Stephanie A. Burk
Middletown, Ohio

IT CAME LIKE A MADNESS TO ME IN October when I learned that Frank Yankovic, the Polka King of Cleveland, had died. His best-known hit was "Just Because," and for five days and nights, at any time and in any place, either aloud or in my head, I sang it. How do I know the lyrics and why was *this* song stored in my brain? And why am I singing it while I write this?

Priscilla Robinson
Framingham, Massachusetts

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PHENOMENA

COMMENT & NOTES

Ailing? Just Add Cells

NOW WE CAN GROW THE CELLS FROM WHICH ALL OTHERS DERIVE, BUT ETHICAL QUESTIONS ARE INVOLVED

BY JOHN P. WILEY, JR.

Culture trays containing colonies of human embryonic stem cells are placed in warm incubators to grow and divide at the University of Wisconsin at Madison.

THERE'S MAJOR NEWS THESE DAYS, for those of us teetering on the edge of geezerhood, our memories fading and our vital organs wheezing. Now it appears that things don't have to be that way. All our lives we have been told, for example, that the human brain cannot regenerate lost neurons: it really is downhill all the way. Late last year, however, undeterred researchers found that, at least under some conditions, the brain does indeed grow new cells. Not only that, but the day may be coming when we will be able to have new neurons injected into our brains.

November of last year brought the extraordinary news that teams of scientists at the University of Wisconsin at Madison and the Johns Hopkins University School of Medicine in Baltimore had succeeded in growing human embryonic stem (ES) cells in their laboratories. These are cells, usually formed early in an embryo's development, that have the potential to become any kind of cell but have not yet begun to differentiate. More about how they work in a minute, but for now the news is that the possibilities they represent are staggering. The researchers expect someday to take some of those stem cells and grow them into heart muscle cells, for example, and then inject those cells directly into the hearts of patients whose cardiac function has been weakened by heart attacks. Congestive heart failure could become a reversible condition. Or conceivably, stem cells could be induced to become pancreatic islet cells, manufacturing more insulin for patients who had been diabetic as a result of cell damage.

Any research on human embryos sets off alarms. The few-days-old cluster of cells that are taken apart to obtain stem cells are potential precursors of human beings. For some, any work that prevents them from becoming so is murder whether, as the spokeswoman for one group said, "it's done in the womb or a petri dish." Current federal law prohibiting the use of federal money for research on human embryos was restated just last October in the appropriations bill.

President Clinton took notice when a small company in Massachusetts claimed that it could induce human cells to revert to the undifferentiated embryonic state by fusing them with cow eggs, whose nuclei have been removed, to produce hybrid cells. He asked the National Bioethics Advisory Commission to consider the implications and report back to him "as soon as possible." And recently Senate hearings were held to examine the ethical issues.

When a human egg is fertilized, it begins to multiply. After about five days, it has become a blastocyst, a fluid-filled sphere made up of cells that will become the placenta, and 15 to 20 cells clinging together and to the inside of the blastocyst wall that will become the embryo. These inner cells will give rise to embryonic stem cells, each identical to the others, and each

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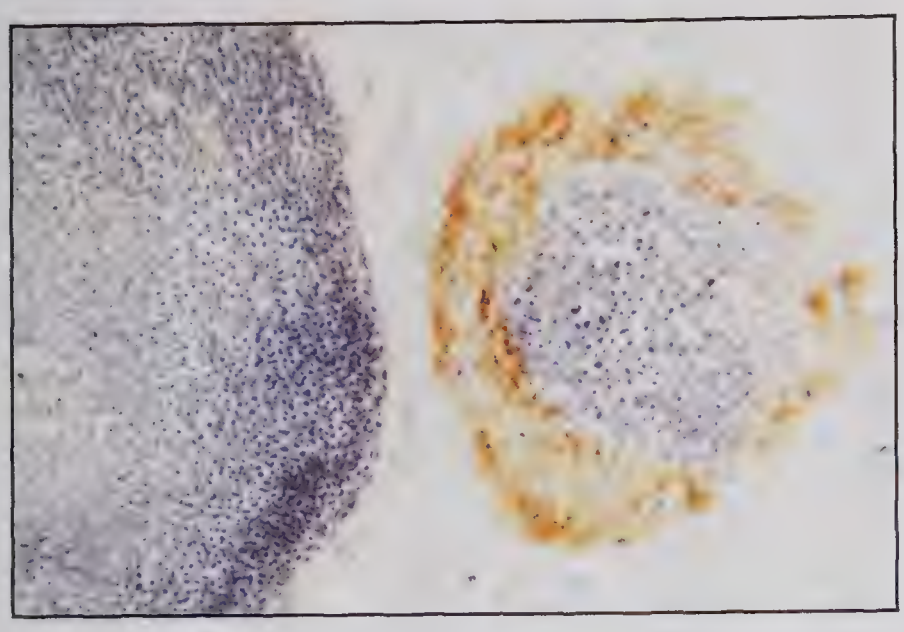

After staining, the cell colony at left shows no differentiated cells. The orange area of the colony at right does.

able to become any kind of cell in the human body. One of the goals of cell biology is to find out how each cell "decides" what to become—what it is that causes one to become a liver cell while another becomes bone.

What the Wisconsin and Johns Hopkins groups have done is to grow embryonic stem cells in a special medium that prevents them from specializing. Raised that way, they will grow and divide forever. When the cells are transferred to a nutrient bath that allows them to differentiate, they do so. Thus far the scientists cannot dictate what the cells will become. They can only passively separate them by their function once they have differentiated: ultimately, those that have become heart cells into this culture dish, say, or liver cells into that one. (The differentiation of these ES cells into neurons has already been documented.) They hope, however, to be able in the not-too-distant future to direct the process, to make the cells turn into whatever they want. At the same time they would genetically alter the cells to prevent rejection by the body. Finally, they would simply inject the new cells into the organ that needs them.

The Wisconsin group, led by James A. Thomson, published its work in the November 6 issue of *Science*. The Johns Hopkins group, led by John Gearhart, followed four days later in the *Proceedings of the National Academy of Sciences*. In an unusual twist, Gearhart offered an appreciation of Thomson's work in the same issue of *Science* in which Thomson's paper appeared. The "research and clinical potential for human ES cells is enormous," he writes. They will be used for studies of normal and abnormal human embryo development (birth defects), to test new drugs and especially "as a renewable source of cells for tissue transplantation, cell replacement and gene therapies."

Gearhart ends his discussion by pointing to the legal problems involved in such research. Both the Thomson and Gearhart teams operated in laboratories wholly separate from their regular labs, places where not even an extension cord had been bought with federal money. Thomson used blastocysts left over from in vitro fertilizations that would have been discarded. The donors of the blastocysts gave permission for them to be used in research. Gearhart cultured human ES cells from primordial germ cells (undifferentiated cells that would have become eggs or sperm cells) that he had extracted from aborted fetuses. Federally funded research on fetal tissue is legal, but Gearhart, too, avoided using any federal funds. Instead, money for the research was put up in large part by the Geron Corporation in Menlo Park, California, a biotechnology company that specializes in antiaging research. In return, the company receives essentially exclusive licenses to use the technologies.

Thomas B. Okarma, vice president for research at Geron, said his company does view the cells as different from others, as having "moral authority." But, he adds, because the blastocysts would have been discarded, he believes it is justified to use them to develop lifesaving treatments.

The possibilities of embryonic stem cells represent a huge leap for science and medicine. The news is more than enough for any day, week, month or year. Yet there is more—possibilities so extraordinary that I hesitate to mention them. Briefly, they have to do with cell immortality. The idea goes something like this. The ends of chromosomes are sections of DNA called telomeres. They get a little shorter each time a cell divides until finally they hit a critical length that signals the cell to stop dividing.

In January 1998, Geron biologists reported that an enzyme called telomerase can keep the telomeres from shrinking, allowing cells to live and divide indefinitely. (Something like this is apparently what happens with cancer cells.) Telomerase is active in embryonic stem cells, which as noted above can live and divide forever. When those cells start to differentiate into specific cells for specific organs, the telomerase disappears. The company is trying to find ways to make it reappear so it will work against the deterioration associated with aging. It is also looking for ways to block telomerase in treating cancer. (One more piece of the puzzle appeared in November, when scientists at Rockefeller University announced that an enzyme called tankyrase seems to control telomerase functioning.)

It may be possible, according to Geron scientists, to manipulate human embryonic stem cells so that they retain the ability to divide indefinitely even as they turn into the specialized cells of all the body organs. To put that another way, it may not only be possible to inject a failing heart with new heart cells, but to do so with immortal heart cells. That's the sort of thing that's best to think about for only a few minutes at a time, especially with neurons that are already badly worn.

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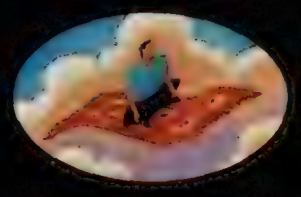

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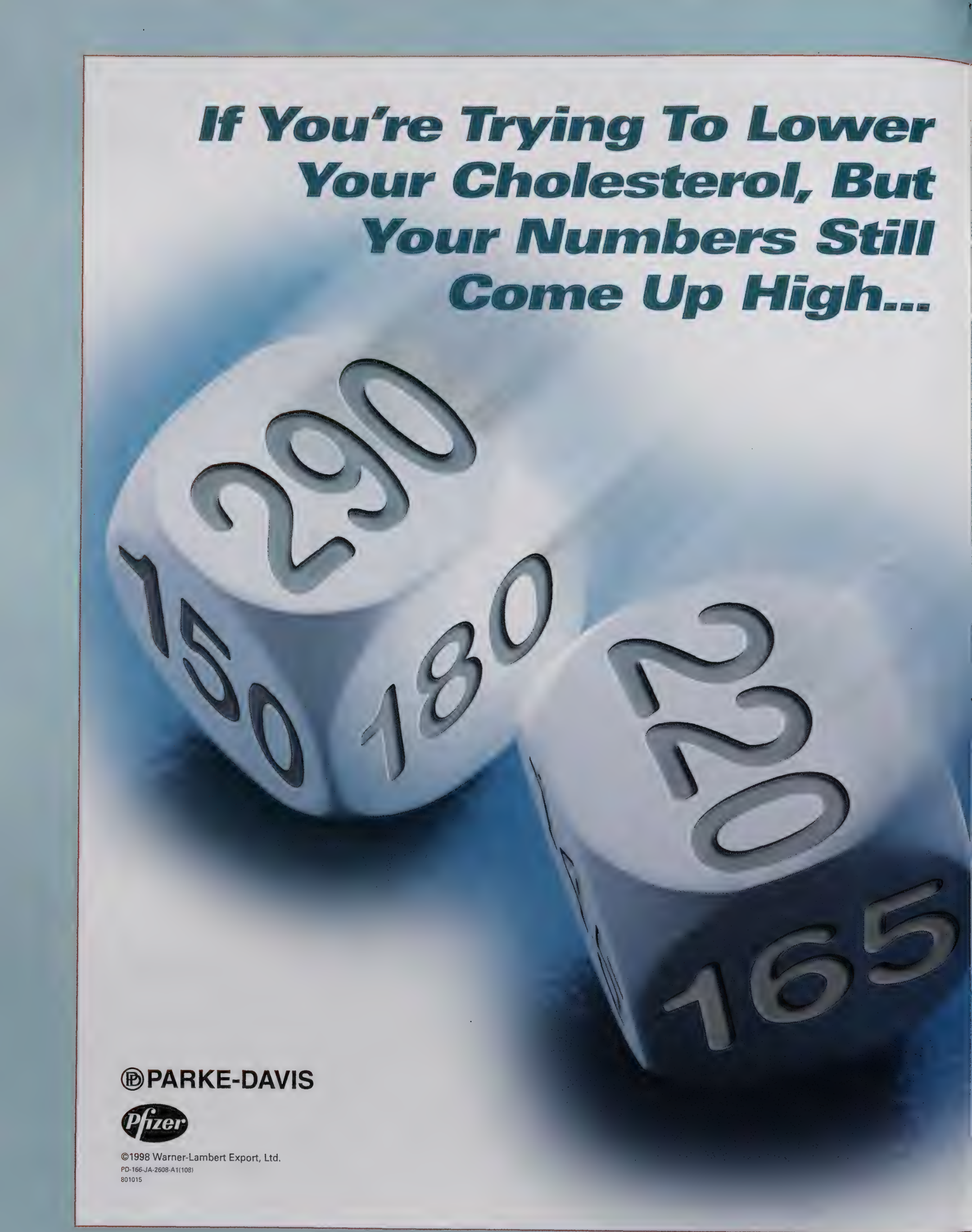

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Brief Summary of Prescribing Information

CONTRAINDICATIONS: Active liver disease or unexplained persistent elevations of serum transaminases. Hypersensitivity to any component of this medication. **Pregnancy and Lactation:** Atherosclerosis is a chronic process and discontinuation of lipid-lowering drugs during pregnancy should have little impact on the outcome of long-term therapy of primary hypercholesterolemia. Cholesterol and other products of cholesterol biosynthesis are essential components for fetal development (including synthesis of steroids and cell membranes). Since HMG-CoA reductase inhibitors decrease cholesterol synthesis and possibly the synthesis of other biologically active substances derived from cholesterol, they may cause fetal harm when administered to pregnant women. Therefore, HMG-CoA reductase inhibitors are contraindicated during pregnancy and in nursing mothers. ATORVASTATIN SHOULD BE ADMINISTERED TO WOMEN OF CHILDBEARING AGE ONLY WHEN SUCH PATIENTS ARE HIGHLY UNLIKELY TO CONCEIVE AND HAVE BEEN INFORMED OF THE POTENTIAL HAZARDS. If the patient becomes pregnant while taking this drug, therapy should be discontinued and the patient apprised of the potential hazard to the fetus.

WARNINGS: Liver Dysfunction — HMG-CoA reductase inhibitors, like some other lipid-lowering therapies, have been associated with biochemical abnormalities of liver function. **Persistent elevations (>3 times the upper limit of normal [ULN] occurring on 2 or more occasions) in serum transaminases occurred in 0.7% of patients who received atorvastatin in clinical trials. The incidence of these abnormalities was 0.2%, 0.2%, 0.6%, and 2.3% for 10, 20, 40, and 80 mg, respectively.** One patient in clinical trials developed jaundice. Increases in liver function tests (LFT) in other patients were not associated with jaundice or other clinical signs or symptoms. Upon dose reduction, drug interruption, or discontinuation, transaminase levels returned to or near pretreatment levels without sequelae. Eighteen of 30 patients with persistent LFT elevations continued treatment with a reduced dose of atorvastatin. **It is recommended that liver function tests be performed prior to and at 12 weeks following both the initiation of therapy and any elevation of dose, and periodically (eg, semiannually) thereafter.** Liver enzyme changes generally occur in the first 3 months of treatment with atorvastatin. Patients who develop increased transaminase levels should be monitored until the abnormalities resolve. Should an increase in ALT or AST of >3 times ULN persist, reduction of dose or withdrawal of atorvastatin is recommended. Atorvastatin should be used with caution in patients who consume substantial quantities of alcohol and/or have a history of liver disease. Active liver disease or unexplained persistent trans-aminase elevations are contraindications to the use of atorvastatin (see CONTRAINDICATIONS).
Skeletal Muscle — Rhabdomyolysis with acute renal failure secondary to myoglobinuria has been reported with other drugs in this class. Uncomplicated myalgia has been reported in atorvastatin-treated patients (see ADVERSE REACTIONS). Myopathy, defined as muscle aches or muscle weakness in conjunction with increases in creatine phosphokinase (CPK) values >10 times ULN, should be considered in any patient with diffuse myalgias, muscle tenderness or weakness, and/or marked elevation of CPK. Patients should be advised to report promptly unexplained muscle pain, tenderness or weakness, particularly if accompanied by malaise or fever. Atorvastatin therapy should be discontinued if markedly elevated CPK levels occur or myopathy is diagnosed or suspected. The risk of myopathy during treatment with other drugs in this class is increased with concurrent administration of cyclosporine, fibric acid derivatives, erythromycin, niacin, or azole antifungals. Physicians considering combined therapy with atorvastatin and fibric acid derivatives, erythromycin, immunosuppressive drugs, azole antifungals, or lipid-lowering doses of niacin should carefully weigh the potential benefits and risks and should carefully monitor patients for any signs or symptoms of muscle pain, tenderness, or weakness, particularly during the initial months of therapy and during any periods of upward dosage titration of either drug. Periodic creatine phosphokinase (CPK) determinations may be considered in such situations, but there is no assurance that such monitoring will prevent the occurrence of severe myopathy. **Atorvastatin therapy should be temporarily withheld or discontinued in any patient with an acute, serious condition suggestive of a myopathy or having a risk factor predisposing to the development of renal failure secondary to rhabdomyolysis (eg, severe acute infection, hypotension, major surgery, trauma, severe metabolic, endocrine and electrolyte disorders, and uncontrolled seizures).**

PRECAUTIONS: General — Before instituting therapy with atorvastatin, an attempt should be made to control hypercholesterolemia with appropriate diet, exercise, and weight reduction in obese patients, and to treat other underlying medical problems (see INDICATIONS AND USAGE in full prescribing information). **Information for Patients** — Patients should be advised to report promptly unexplained muscle pain, tenderness, or weakness, particularly if accompanied by malaise or fever. **Drug Interactions** — The risk of myopathy during treatment with other drugs of this class is increased with concurrent administration of cyclosporine, fibric acid derivatives, niacin (nicotinic acid), erythromycin, azole antifungals (see WARNINGS, Skeletal Muscle). ***Antacid:*** When atorvastatin and Maalox® TC suspension were coadministered, plasma concentrations of atorvastatin decreased approximately 35%. However, LDL-C reduction was not altered. ***Antipyrine:*** Because atorvastatin does not affect the pharmacokinetics of antipyrine, interactions with other drugs metabolized via the same cytochrome isozymes are not expected. ***Colestipol:*** Plasma concentrations of atorvastatin decreased approximately 25% when colestipol and atorvastatin were coadministered. However, LDL-C reduction was greater when atorvastatin and colestipol were coadministered than when either drug was given alone. ***Cimetidine:*** Atorvastatin plasma concentrations and LDL-C reduction were not altered by coadministration of cimetidine. ***Digoxin:*** When multiple doses of atorvastatin and digoxin were coadministered, steady-state plasma digoxin concentrations increased by approximately 20%. Patients taking digoxin should be monitored appropriately. ***Erythromycin:*** In healthy individuals, plasma concentrations of atorvastatin increased approximately 40% with coadministration of atorvastatin and erythromycin, a known inhibitor of cytochrome P450 3A4 (see WARNINGS, Skeletal Muscle). ***Oral Contraceptives:*** Coadministration of atorvastatin and an oral contraceptive increased AUC values for norethindrone and ethinyl estradiol by approximately 30% and 20%. These increases should be considered when selecting an oral contraceptive for a woman taking atorvastatin. ***Warfarin:*** Atorvastatin had no clinically significant effect on prothrombin time when administered to patients receiving chronic warfarin treatment. **Endocrine Function** — HMG-CoA reductase inhibitors interfere with cholesterol synthesis and theoretically might blunt adrenal and/or gonadal steroid production. Clinical studies have shown that atorvastatin does not reduce basal plasma cortisol concentration or impair adrenal reserve. The effects of HMG-CoA reductase inhibitors on male fertility have not been studied in adequate numbers of patients. The effects, if any, on the pituitary-gonadal axis in premenopausal women are unknown. Caution should be exercised if an HMG-CoA reductase inhibitor is administered concomitantly with drugs that may decrease the levels or activity of endogenous steroid hormones, such as ketoconazole, spironolactone, and cimetidine. **CNS Toxicity** — Brain hemorrhage was seen in a female dog treated for 3 months at 120 mg/kg/day. Brain hemorrhage and optic nerve vacuolation were seen in another female dog that was sacrificed in moribund condition after 11 weeks of escalating doses up to 280 mg/kg/day. The 120 mg/kg dose resulted in a systemic exposure approximately 16 times the human plasma area-under-the-curve (AUC, 0-24 hours) based on the maximum human dose of 80 mg/day. A single tonic convulsion was seen in each of 2 male dogs (one treated at 10 mg/kg/day and one at 120 mg/kg/day) in a 2-year study. No CNS lesions have been observed in mice after chronic treatment for up to 2 years at doses up to 400 mg/kg/day or in rats at doses up to 100 mg/kg/day. These doses were 6 to 11 times (mouse) and 8 to 16 times (rat) the human AUC (0-24) based on the maximum recommended human dose of 80 mg/day. CNS vascular lesions, characterized by perivascular hemorrhages, edema, and mononuclear cell infiltration of perivascular spaces, have been observed in dogs treated with other members of this class. A chemically similar drug in this class produced optic nerve degeneration (Wallerian degeneration of retinogeniculate fibers) in clinically normal dogs in a dose-dependent fashion at a dose that produced plasma drug levels about 30 times higher than the mean drug level in humans taking the highest recommended dose. **Carcinogenesis, Mutagenesis, Impairment of Fertility** — In a 2-year carcinogenicity study in rats at dose levels of 10, 30, and 100 mg/kg/day, 2 rare tumors were found in muscle in high-dose females: in one, there was a rhabdomyosarcoma and, in another, there was a fibrosarcoma. This dose represents a plasma AUC (0-24) value of approximately 16 times the mean human plasma drug exposure after an 80 mg oral dose. A 2-year carcinogenicity study in mice given 100, 200, or 400 mg/kg/day resulted in a significant increase in liver adenomas in high-dose males and liver carcinomas in high-dose females. These findings occurred at plasma AUC (0-24) values of approximately 6 times the mean human plasma drug exposure after an 80 mg oral dose. *In vitro*, atorvastatin was not mutagenic or clastogenic in the following tests with and without metabolic activation: the Ames test with *Salmonella typhimurium* and *Escherichia coli*, the HGPRT forward mutation assay in Chinese hamster lung cells, and the chromosomal aberration assay in Chinese hamster lung cells. Atorvastatin was negative in the *in vivo* mouse micronucleus test. Studies in rats performed at doses up to 175 mg/kg (15 times the human exposure) produced no changes in fertility. There was aplasia and aspermia in the epididymis of 2 of 10 rats treated with 100 mg/kg/day of atorvastatin for 3 months (16 times the human AUC at the 80 mg dose); testis weights were significantly lower at 30 and 100 mg/kg and epididymal weight was lower at 100 mg/kg. Male rats given 100 mg/kg/day for 11 weeks prior to mating had decreased sperm motility, spermatid head concentration, and increased abnormal sperm. Atorvastatin caused no adverse effects on semen parameters, or reproductive organ histopathology in dogs given doses of 10, 40, or 120 mg/kg for two years. **Pregnancy: Pregnancy Category X — See CONTRAINDICATIONS.** Safety in pregnant women has not been established. Atorvastatin crosses the rat placenta and reaches a level in fetal liver equivalent to that of maternal plasma. Atorvastatin was not teratogenic in rats at doses up to 300 mg/kg/day or in rabbits at doses up to 100 mg/kg/day. These doses resulted in multiples of about 30 times (rat) or 20 times (rabbit) the human exposure based on surface area (mg/m^2). In a study in rats given 20, 100, or 225 mg/kg/day, from gestation day 7 through to lactation day 21 (weaning), there was decreased pup survival at birth, neonate, weaning, and maturity in pups of mothers dosed with 225 mg/kg/day. Body weight was decreased on days 4 and 21 in pups of mothers dosed at 100 mg/kg/day; pup body weight was decreased at birth and at days 4, 21, and 91 at 225 mg/kg/day. Pup development was delayed (rotorod performance at 100 mg/kg/day and acoustic startle at 225 mg/kg/day; pinnae detachment and eye opening at 225 mg/kg/day). These doses correspond to 6 times (100 mg/kg) and 22 times (225 mg/kg) the human AUC at 80 mg/day. Rare reports of congenital anomalies have been received following intrauterine exposure to HMG-CoA reductase inhibitors. There has been one report of severe congenital bony deformity, tracheo-esophageal fistula, and anal atresia (VATER association) in a baby born to a woman who took lovastatin with dextroamphetamine sulfate during the first trimester of pregnancy. LIPITOR should be administered to women of child-bearing potential only when such patients are highly unlikely to conceive and have been informed of the potential hazards. If the woman becomes pregnant while taking LIPITOR, it should be discontinued and the patient advised again as to the potential hazards to the fetus. **Nursing Mothers:** Nursing rat pups had plasma and liver drug levels of 50% and 40%, respectively, of that in their mother's milk. Because of the potential for adverse reactions in nursing infants, women taking LIPITOR should not breast-feed (see CONTRAINDICATIONS). **Pediatric Use:** Treatment experience in a pediatric population is limited to doses of LIPITOR up to 80 mg/day for 1 year in 8 patients with homozygous FH. No clinical or biochemical abnormalities were reported in these patients. None of these patients was below 9 years of age. **Geriatric Use:** Treatment experience in adults age ≥70 years with doses of LIPITOR up to 80 mg/day has been evaluated in 221 patients. The safety and efficacy of LIPITOR in this population were similar to those of patients <70 years of age.

ADVERSE REACTIONS: LIPITOR is generally well-tolerated. Adverse reactions have usually been mild and transient. In controlled clinical studies of 2502 patients, <2% of patients were discontinued due to adverse experiences attributable to atorvastatin. The most frequent adverse events thought to be related to atorvastatin were constipation, flatulence, dyspepsia, and abdominal pain. **Clinical Adverse Experiences:** Adverse experiences reported in ≥2% of patients in placebo-controlled clinical studies of atorvastatin, regardless of causality assessment, are shown in the following table.

Adverse Events in Placebo-Controlled Studies (% of Patients)

BODY SYSTEM Adverse Event	Placebo N = 270	Atorvastatin 10 mg N = 863	Atorvastatin 20 mg N = 36	Atorvastatin 40 mg N = 79	Atorvastatin 80 mg N = 94
BODY AS A WHOLE					
Infection	10.0	10.3	2.8	10.1	7.4
Headache	7.0	5.4	16.7	2.5	6.4
Accidental Injury	3.7	4.2	0.0	1.3	3.2
Flu Syndrome	1.9	2.2	0.0	2.5	3.2
Abdominal Pain	0.7	2.8	0.0	3.8	2.1
Back Pain	3.0	2.8	0.0	3.8	1.1
Allergic Reaction	2.6	0.9	2.8	1.3	0.0
Asthenia	1.9	2.2	0.0	3.8	0.0
DIGESTIVE SYSTEM					
Constipation	1.8	2.1	0.0	2.5	1.1
Diarrhea	1.5	2.7	0.0	3.8	5.3
Dyspepsia	4.1	2.3	2.8	1.3	2.1
Flatulence	3.3	2.1	2.8	1.3	1.1
RESPIRATORY SYSTEM					
Sinusitis	2.6	2.8	0.0	2.5	6.4
Pharyngitis	1.5	2.5	0.0	1.3	2.1
SKIN AND APPENDAGES					
Rash	0.7	3.9	2.8	3.8	1.1
MUSCULOSKELETAL SYSTEM					
Arthralgia	1.5	2.0	0.0	5.1	0.0
Myalgia	1.1	3.2	5.6	1.3	0.0

The following adverse events were reported, regardless of causality assessment in patients treated with atorvastatin in clinical trials. The events in italics occurred in ≥2% of patients and the events in plain type occurred in <2% of patients.

Body as a Whole: *Chest pain,* face edema, fever, neck rigidity, malaise, photosensitivity reaction, generalized edema. ***Digestive System:*** *Nausea,* gastroenteritis, liver function tests abnormal, colitis, vomiting, gastritis, dry mouth, rectal hemorrhage, esophagitis, eructation, glossitis, mouth ulceration, anorexia, increased appetite, stomatitis, biliary pain, cheilitis, duodenal ulcer, dysphagia, enteritis, melena, gum hemorrhage, stomach ulcer, tenesmus, ulcerative stomatitis, hepatitis, pancreatitis, cholestatic jaundice. ***Respiratory System:*** *Bronchitis, rhinitis,* pneumonia, dyspnea, asthma, epistaxis. ***Nervous System:*** *Insomnia, dizziness,* paresthesia, somnolence, amnesia, abnormal dreams, libido decreased, emotional lability, incoordination, peripheral neuropathy, torticollis, facial paralysis, hyperkinesia, depression, hypesthesia, hypertonia. ***Musculoskeletal System:*** *Arthritis,* leg cramps, bursitis, tenosynovitis, myasthenia, tendinous contracture, myositis. ***Skin and Appendages:*** Pruritus, contact dermatitis, alopecia, dry skin, sweating, acne, urticaria, eczema, seborrhea, skin ulcer. ***Urogenital System:*** *Urinary tract infection,* urinary frequency, cystitis, hematuria, impotence, dysuria, kidney calculus, nocturia, epididymitis, fibrocystic breast, vaginal hemorrhage, albuminuria, breast enlargement, metrorrhagia, nephritis, urinary incontinence, urinary retention, urinary urgency, abnormal ejaculation, uterine hemorrhage. ***Special Senses:*** Amblyopia, tinnitus, dry eyes, refraction disorder, eye hemorrhage, deafness, glaucoma, parosmia, taste loss, taste perversion. ***Cardiovascular System:*** Palpitation, vasodilatation, syncope, migraine, postural hypotension, phlebitis, arrhythmia, angina pectoris, hypertension. ***Metabolic and Nutritional Disorders:*** *Peripheral edema,* hyperglycemia, creatine phosphokinase increased, gout, weight gain, hypoglycemia. ***Hemic and Lymphatic System:*** Ecchymosis, anemia, lymphadenopathy, thrombocytopenia, petechia. ***Postintroduction Reports:*** Adverse events associated with LIPITOR therapy reported since market introduction, that are not listed above, regardless of causality assessment, include the following: anaphylaxis, angioneurotic edema and rhabdomyolysis.

OVERDOSAGE: There is no specific treatment for atorvastatin overdosage. In the event of an overdose, the patient should be treated symptomatically, and supportive measures instituted as required. Due to extensive drug binding to plasma proteins, hemodialysis is not expected to significantly enhance atorvastatin clearance.

Consult package insert before prescribing LIPITOR® (Atorvastatin Calcium) Tablets.

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Revised July 1998

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Trailing the Big Cats

FOR A WALK ON THE WILD SIDE, FOLLOW THE TRACKS OF A TIGER OR LOOK AT A LION CLOSE UP AT THE NATIONAL ZOO

BY MICHAEL KERNAN

"I SIT IN A *MACHAN*, A TREE PLATform, alone, perched over a kill, waiting for the tiger to return . . . all is still, completely still. Until I feel, and then hear, footfalls crunching leaves. The sound is steady, deliberate, and direct to the kill. I hardly breathe, knowing the slightest movement will elicit a deep, terrifying growl before the tiger retreats into the night."

So goes the dream of John Seidensticker, curator of mammals at the National Zoological Park, chairman of the Save the Tiger Fund Council and a great friend of the tiger ever since he pioneered the use of radiotelemetry in tracking these spectacular beasts in the wild.

Thanks to him and others, the National Zoo now has a machan of its own, where even children can get a close-up view of some of the tigers and lions that live there. Or they can also walk the 278-foot wooden elevated trail called "Tiger Tracks," to work the interactive information devices designed with children in mind. Both the machan and "Tiger Tracks" are part of the new "Great Cats" exhibit, which also features educational facilities, natural history specimens and lookouts for kids.

"Tiger Tracks" is a trip. You walk along the hillside, nicely landscaped with pampas grass and bamboo, overlooking one of Washington's more unexpected rural scenes, complete with a sparkling creek, and you are invited to read cunningly placed placards containing educational tips. Question on wooden book cover: How powerful is a tiger's bite? You open the cover: It can bite through a two-by-four. How strong is a tiger? It can bring down a 2,000-pound animal. There is all the information here that you could ask for.

There is an exhibit of bronze tiger paws, one taken from a plaster cast made of a tiger at the Zoo, an operation I would like to have seen, I think. You can fit your spread hand nicely inside one. There is also a bronze tiger tongue that you can rub. It is as rough as sandpaper. And here is a scale on which you can compare your weight with a tiger's 500 pounds. That is a fairly large male. The female weighs from about one-half to two-thirds as much as her male counterpart.

Following the tracks (of a tiger mother and her cub) along the trail, you learn about the risks of being a tiger in the first place: about half the cubs die in their first year.

Left: On the new "Tiger Tracks" trail, Whitney Reed compares her hand with a bronze cast of a tiger's paw. Above: Tsavo, age 10, communes with his mom, Thandi, 14, in the Lion Habitat.

PETE SOUZA/FOLIO; REGIS LEFEBURE

An interactive device lets a child push a button to hear a recorded tiger's roar.

REGIS LEFEBURE

Also, they need to eat—a lot. For instance: Taj, the 14-year-old white tiger, a mix of Siberian and Bengal subspecies, bolts down 65 pounds of horse meat and oxtails every week. But then, he weighs 340 pounds and has to keep his strength up. He can expect to live another five or six years at the zoo, though in the jungle he would be running out of time at 14. Rokan, a Sumatran male, the smallest of the five surviving subspecies, is considered overweight at 338 pounds, so he gets only 30 pounds of meat a week. Kerinci, a 13-year-old tigress from Sumatra, where she was found as an orphaned cub, weighs 178 pounds and gets 62 pounds a week (she has a terrific metabolism and tends not to gain weight). Her daughter, Soy, 5, is bigger than she is. At 186 pounds, Soy eats 32 pounds of meat a week.

These animals are something special. Although any individual lion can outweigh any individual tiger (we'll get to the lions a bit later), tigers in general are considered the largest carnivores on land. Carnivores eat only meat, of course, which means they eat other mammals that live on plants. Which means they need a huge amount of space, because their habitat has to include not only plenty of water and vegetation cover but also enough territory to support the deer and pigs that they eat and the plants that the deer and pigs eat in turn.

Catch a glimpse of the British countryside right in the heart of London.

Buckingham Palace, London

This T. rex skull is an arresting sight. It sports six-inch teeth and jaws four feet in length.

That's why there aren't and never have been all that many tigers around.

Today there are only about 6,000 wild tigers on the planet, mostly in India and Southeast Asia. It sounds like a lot, but even after 30 years of efforts by conservationists the tiger is endangered.

"The early '90s were dark days for tigers," says John Seidensticker. An ecologist, he worked for the Smithsonian in Nepal, then for the World Wildlife Fund in Indonesia and Bangladesh, and eventually returned to work at the Zoo in 1983. "They're endangered for two basic reasons, one short-term and one long-term.

"The short-term problem is poaching," explains Seidensticker. "Tiger bones are a valued element in traditional Chinese medicine. Bone is used in wine or in pill form, often for rheumatism, just as we take aspirin. Tiger bone wine is great for what ails grandpa."

Efforts are under way to promote acceptable substitutes, says Seidensticker, but getting people to use them may prove challenging. "It's not like bear bile, which is very big in East Asian medicine and is used to treat such life-threatening diseases as stomach cancer. And about the aphrodisiac effect of tiger parts: that's myth."

The long-term problem for tigers is the steady fragmentation and degradation of habitat that occurs when forests are burned or cut down and when prey—such as the deer and pigs that are also hunted by man—begin to vanish.

Meanwhile, at the Zoo, the four tigers and three lions enjoy 30,000 square feet of space shaded by oaks and Himalayan pines (whose flanks are padded with extra bark for protection against claws), three grassy terraces with dens, and a moat of clear water. A path or walkway runs around the habitat, and it is there, or at the machan, that you can watch these lovely creatures living out their lives.

In places glass windows have been installed in the walkway wall for the use of wheelchair visitors (who have access to the machan and to "Tiger Tracks" as well). Along the way are special alcoves, including the Kid's Stop that provides glass-fronted lookouts for children.

The Predator's Alcove, a mini-museum, features fossils and examines the ecology of tigers, lions and other predators. It also displays a bronze casting of a *Tyrannosaurus rex* skull, to remind visitors who was the greatest terrestrial

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Keepers realize that they could be dinner. They don't go into the enclosure when a tiger is inside.

predator of all time. Now life-size tiger paws are all very well, but this skull is an arresting sight. It sports six-inch teeth and jaws that extend four feet in length. But then the *T. rex* could grow 20 feet tall and 40 feet long, every inch of it hungering to gobble you alive.

Unlike lions, a tiger hunts alone, roaming up to 20 miles a night in search of the 30 or 40 pounds of meat it must eat during the course of a week. It may take as many as 20 hunts to bring in a kill that provides enough food. Like many hunters, the tiger is territorial. Where the prey is plentiful, say in Nepal, a female may need about 8 square miles, but on the far eastern coast of Russia she can require up to 200 square miles. Male territories are even larger but overlap with those of females.

Every cat lover has an overpowering need to pat a tiger or lion and scratch it behind its furry ears. This is not a good idea. The keepers know. The keepers realize that to the tigers they are a potential dinner. At the Zoo one does not go into the enclosure even with the nicest tiger.

Keepers must go through a series of safety gates (sign: "Please Don't Feed Fingers to Animals") to reach a tiger's indoor enclosure. There, while the big cat is outside, they check out any untouched food, any abnormality in the feces. They get to know cats and the clues they leave. Some cats are light eaters anyway. Some are stoic about illness and have to be watched for small signs of pain. Between the enclosure and the yard are two steel doors with dead bolts that set off a runway. Keepers move the cats along this runway with the aid of sliding doors on pulleys, color-coded for safety. Thus, doors leading into the runway are blue with blue handles, and doors inside the runway, used when more than one tiger is being run through, are yellow. In the evenings tigers are brought back inside.

This is the fun part of the keeper's job. The other part includes mucking out the enclosures and defrosting and weighing the ground meat for dinner. Rokan gets about four pounds a day. He is fed indoors through a food chute. Just in case someone gets the idea that it might be interesting to feed a tiger by hand, a metal feed pan has been hung on the wall by the food preparation area. The pan is torn half to shreds by a tiger's long, sharp canines.

On Sundays the tigers get oxtails, something like bones

information

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"This is a zoo, and it should be fun, but we need to convey the educational message, too."

for dogs—except they're two feet long.

Both lions and tigers sleep most of the day—20 hours in fact—and the rest of the time the big cats prowl their territory, marking the boundaries with scent. They do have large 30-pound balls to play with, and on a hot day Rokan (but not the lions) will bat one into the moat and swim after it.

"Great Cats" has been a long time aborning. Seidensticker told me the idea arose in the early '80s as conservationists realized just how endangered tigers were. The plan was to replace the fading posters and run-down graphics in the Lion/Tiger House (built in 1976) with materials that would better educate the public about tigers and other big cats.

"We thought we could do it by 1986, the building's tenth anniversary," says Seidensticker. "Boy, was I wrong; I had no idea how much effort it would take. It was not until the Save the Tiger Fund came along, backed by the National Fish and Wildlife Foundation and Exxon Corporation, that things began to take shape.

"This is a zoo," he added, "and it should be fun, but we need to convey the educational message, too—serious information about the importance of saving the tiger in the wild."

Part of the tiger conservation program is breeding. Soy, the 5-year-old, or Kerinci, her mother, is to be bred with Rokan to produce, with luck, more Sumatran tigers. Kerinci's previous litters consisted of two cubs each. (Gestation is about 106 days, by the way.)

On my way out I visited the lions, who live on the other side of the hill. I saw Thandi, a 263-pound lioness, 14 years old, stretched out on the grassy slope, dead to the world. Nearby, but paying no attention to her, sat the twin brothers, Tsavo and Tana, 10 years old on November 15. They each weigh around 485 pounds. Tsavo is supposed to have a shorter mane than Tana, and a scar on his nose, but to me they looked identical.

There they lounged, on the top terrace, side by side—I read that male lions are very companionable—with their front paws hanging over the grassy edge while they stared in perfect unison at all these people who were being exhibited to them on the other side of the moat.

I was going to whisper "Kitty, kitty, kitty!" but they would have been mortified.

THE OBJECT AT HAND

Picturing Pocahontas

AN IMAGE AT THE NATIONAL PORTRAIT GALLERY MAY BE THE TRUEST ACCOUNT WE HAVE OF THE INDIAN PRINCESS

BY JOHN F. ROSS

THE CORPULENT VISAGE OF HENRY VIII PEERS AT ME ACROSS the centuries from the pages of *Baziliωlogia: A Booke of Kings*. As I leaf through the 1618 edition, another engraved portrait jumps out at me—a New World princess from Virginia. Though nobility radiates from her resolute eyes, Pocahontas couldn't be more different from the other royals. A Jacobean stovepipe hat and lacy ruff can't hide her non-Anglo roots. Was this the face that launched a thousand myths?

"Yes," answers Wendy Wick Reaves, a curator at the National Portrait Gallery. This engraving of Pocahontas is the only known life portrait. "Life portraits," Reaves continues, "are our greatest treasures." The engraving is the oldest item in the NPG's 18,000-piece collection.

The Portrait Gallery also owns a more recent image, an oil painting of Pocahontas done more than a century later by an unknown artist who probably worked from the engraving. Mythmaking has begun to work its subtle magic on her face: the complexion is fairer and anglicized; the high cheekbones no longer seem so prominent. The hair is European brown not Native American black; the intensity in the eyes has softened.

Anyone trying to get a reasonable fix on the lady, somewhere between dry history and the Disney version, soon finds out that none of the details of her real life come from her own words. Historians have pieced together her life from the accounts of others, most notably her friend, Capt. John Smith, whose veracity of detail and recollection is, to put it mildly, questionable. During the intervening four centuries others have showered her with virtues. Poets and writers from Thackeray to Hart Crane celebrated her charm. More lately rocker Neil Young sang, "I would give a thousand pelts / To . . . find out how she felt." And now we have the animated eco-warrior princess from Disney.

Needless to say, many fabled stories of her life are partly fiction. Top among them is her rescue of Capt. John Smith from execution, romanticized in eternal stone relief in the U.S. Capitol. Their celebrated love affair probably never happened, either. We do know that Pocahontas was born Matoaka, the favored daughter of Powhatan, the powerful chief of the Powhatan Confederacy of Tidewater Algonquian tribes. "Pocahontas" is a pet name meaning "frolicsome." In 1607, when she was about 12, she first saw the 104 Jamestown colonists struggling to survive on a low-lying peninsula (now an island) in the James River.

Virginia's stifling summers and the swampy ground bred disease. With remarkable lack of foresight, the colony had far too few workers skilled in the basics of survival, and those not brought low by disease (more than half succumbed by the end of the first summer) lived in fear of random Indian arrows. Both English and Powhatans murdered each other in periodic skirmishes and reprisals. Far from being a peace-loving Indian leader, Powhatan hacked and tortured his way to power. He even hired Indian warrior mercenaries to butcher his rivals. In shooting Indians, the English proved no better. Twice a day by royal decree, they recited a prayer for the "plantation" that declared its aim to "display the banner of Jesus Christ, even here where Satan's throne is. . . ."

The life portrait of Pocahontas (top), done in 1616, depicts a more powerful personality than the Anglicized 18th-century oil.

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In a romantic 1840 painting in the U.S. Capitol, Pocahontas kneels to be baptized into the Christian faith.

Pocahontas managed to visit the fort during sporadic peaceful moments. William Strachey, secretary of the colony, described the little girl as "wanton," because she cavorted with young colonists, cartwheeling naked "all the Fort over."

One Englishman, Capt. John Smith, proved an exception to the general haplessness of the little colony. A man of action and a veteran of foreign wars, Smith saw Pocahontas as a possible bridge to the Indians, and perhaps a key to the survival of the colony. No one at Jamestown could forget that the 116 English colonists of Sir Walter Raleigh's Roanoke Colony from the 1587 expedition had vanished without a trace. Smith learned Algonquian words and customs from Pocahontas, and her friendship brought tangible benefits to the English. This much of the standard story is true.

And so is the part that tells how Smith wandered into a Powhatan ambush. The Indians killed his comrades, took him prisoner and led him before Powhatan, who treated him to a feast. Whether Powhatan intended it as the last meal of a condemned man or the celebration of an honored guest is still debated. Years after the rescue, Captain Smith—eccentrically writing about himself in the third person in his *Generall Historie*—recalled how Indian warriors brought out "two great stones . . . and thereon laid his head," preparing to smash it with their war clubs, when Pocahontas took it "in her armes, and laid her owne upon his to save him from death."

Many historians doubt Smith's life was ever in peril. A popular theory, based on tenuous evidence, holds that Smith unwittingly participated in an adoption ceremony in which ritualized death brought symbolic rebirth as an Indian. "Clubbing," notes ethnohistorian Helen Rountree, "was a punishment for disobedient subjects, not a treatment for foreigners." Slow torture and execution by flaying, burning and dismemberment should have been the fate of an adversary of Smith's stature. In any case, Powhatan gave Smith the Indian town of Capahosic to rule, called him a son and returned him to Jamestown unharmed.

For a while, there was a measure of peace. Powhatan supplied the colonists with food, often brought by Pocahontas. When relations worsened, she shuttled back and forth, trying to explain how each side felt. She saved the life of a young colonist who wandered into an Indian camp. Perhaps the boldest act of her life was warning Smith about her own father's impending act of treachery, probably saving his life and ensuring the survival of the colony. He later wrote Queen Anne that Pocahontas "was . . . the instrument to preserve this Colonie from death, famine and utter confusion." The colonists repaid her kindness by kidnapping her to get concessions from her father. By this time, Smith had returned to England.

Pocahontas eased relations between Indians and colonists by marrying widower John Rolfe, the founder of English tobacco-growing in Virginia. An able student of English, she was baptized and took the Christian name of Rebecca. Eventually, the sponsors of the Jamestown Colony saw marketing possibilities in this regal, converted, English-speaking princess. Luring new colonists to Jamestown and finding investors for the venture was a hard sell. What better "poster girl" than Pocahontas?

In the spring of 1616, Pocahontas, Rolfe, their infant son, Thomas, and a retinue of Indians sailed for England. Pocahontas was presented to King James I and the court. She became America's first celebrity. Poet and dramatist Ben Jonson met her, asked her several questions, then stared at her intently for 45 minutes without saying a word. She finally got up and walked away.

But the damp English weather and the smoke from London's coal fires began to take a toll on her health. Several coughing spells forced her to bed. After seven months, though Pocahontas was very ill, Rolfe's family prepared to sail back to Virginia. Rolfe wanted to get back to raising tobacco. Pocahontas had helped the colony win more backing and royal favor for Virginia, but she paid a tragic personal price. While the anchored ship waited for a fair wind, she died of tuberculosis or pneumonia in Gravesend. She was about 22 years old. After the funeral, Rolfe, who was told their baby son wouldn't survive the journey, left Thomas with an uncle and sailed back to the colony, never to return.

Sometime during Pocahontas' stay in England, Simon Van de Passe, the 21-year-old son of a famous Dutch engraver, did her portrait on a copper plate. Prints were sold to the curious, eager to feast their eyes on the exotic princess who had so bravely assisted the colonists.

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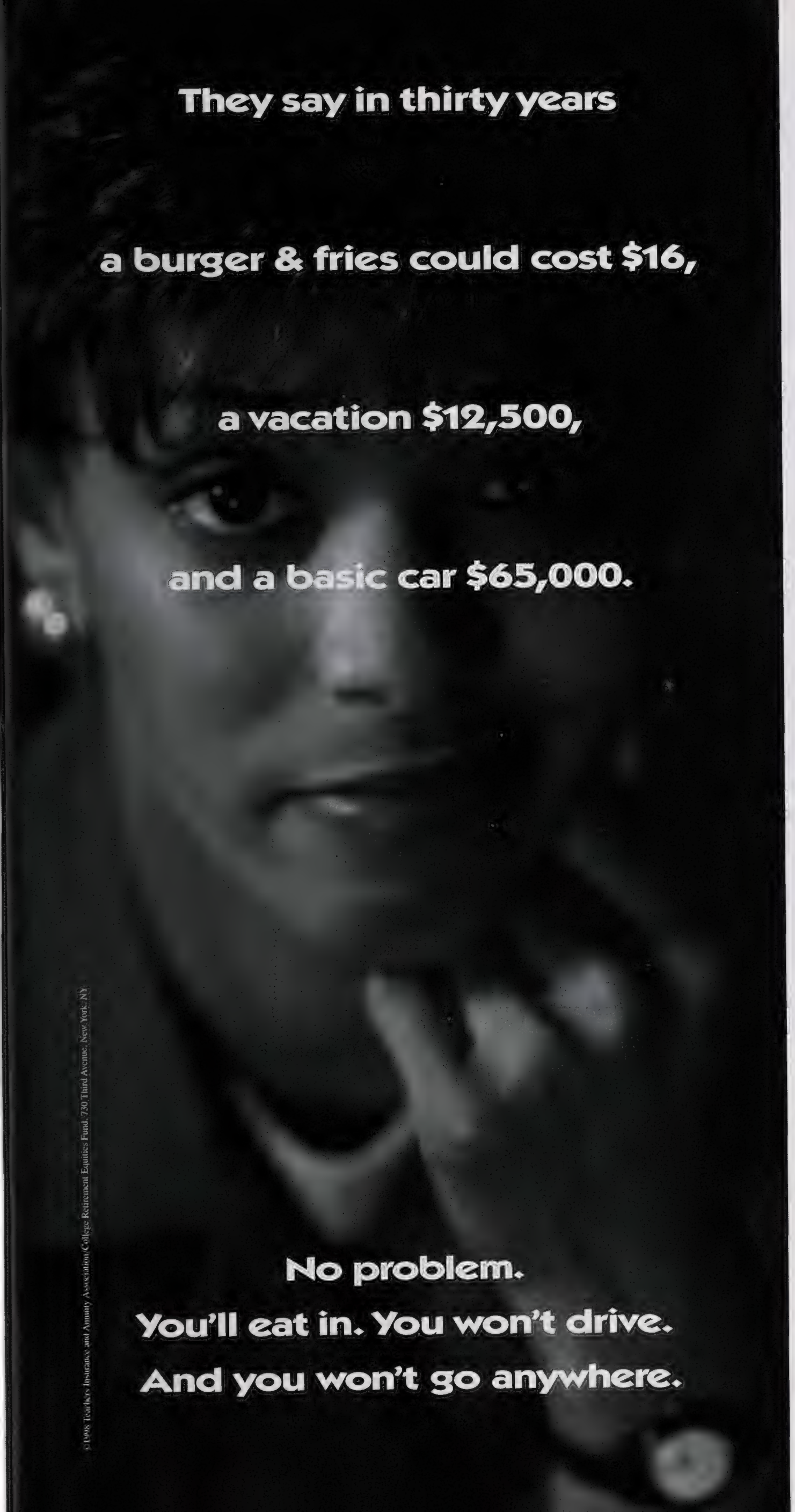
Portraiture as Head Game

PHILIPPE HALSMAN VIEWED PORTRAITURE as a game, and in 1963, on the set of *The Birds*, he got Hitchcock to play. (This new year, 1999, would have been dear Alfred's 100th.) By asking celebrities to do silly things, Halsman caught them off guard and broke through the veneer. He compared his ability to reveal character to the work of a good therapist. "It can't be done by pushing the person into position or arranging his head at a certain angle. It must be accomplished by provoking the victim, amusing him . . . lulling him . . . or asking impertinent questions which his best friend would be afraid to voice." "Philippe Halsman: A Retrospective" is at the National Portrait Gallery until February 7, and is accompanied by a book from Little, Brown. More pictures by Halsman can be seen at www.smithsonianmag.si.edu. —*Bruce Hathaway*

SMITHSONIAN HIGHLIGHTS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SMITHSONIAN HIGHLIGHTS

The Mississippi: River of Song

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Geno Delafose performs at a zydeco dance hall in Opelousas, Louisiana.

Presented by Smithsonian Productions and hosted by folk-rock musician Ani DiFranco, the four-part television series on PBS premieres January 6 at 10 P.M.; the seven-part radio series also begins in January. Check local public television and radio listings. For stories about the musicians, and for an on-line study guide and interactive music map of the river, visit the River of Song Website at www.pbs.org/riverofsong.

Teddy

Theodore Roosevelt: Icon of the American Century features more than 100 paintings, photographs, political cartoons and memorabilia documenting the rough-riding 26th President's style and his enthusiastic pursuit of what he called "the strenuous life." National Portrait Gallery, through February 7.

SMITHSONIAN Website

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Another place to start finding out about the exhibitions, events, publications, programs and activities of the Smithsonian is at our Website. There you will find the *Highlights Calendar* with links to the many pages of the Smithsonian Institution Website.

Exhibitions, Events

NATIONAL MUSEUM OF NATURAL HISTORY

The newly opened Rocks Gallery completes the installation of the Janet Annenberg Hooker Hall of Geology, Gems and Minerals. The gallery showcases some of the world's most exciting rocks and explains how rocks record and verify geological processes that have shaped our planet.

Tigers!, a new diorama, is presented in conjunction with the National Zoological Park's new *Great Cats* hill, featuring *Tiger Tracks*, an interpretive trail for children.

NATIONAL MUSEUM OF AMERICAN HISTORY

A Visual Journey: Photographs by Lisa Law 1964-1971 (through March) Documents the sweeping cultural and political changes of the 1960s.

A Collector's Vision of Puerto Rico (through May) Items from Teodoro Vidal's 3,200-object collection. Costumes, jewelry and more.

NATIONAL PORTRAIT GALLERY

Philippe Halsman: A Retrospective (through February 7—the exhibition then travels to Tucson, Arizona; Grand Rapids, Michigan; Toledo, Ohio; and Manchester, New Hampshire) Seventy-three vintage prints, focusing on celebrity portraits published in popular magazines from the 1930s to the 1970s. *Life* magazine published 101 covers by Halsman, more than by any other photographer.

HIRSHHORN MUSEUM & SCULPTURE GARDEN

This year, 1999, the Hirshhorn celebrates its 25th anniversary. In late January, the renovated third-floor galleries will reopen with works by Hopper, Brancusi, de Kooning and other favorites.

Planning a Smithsonian Visit?

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Begin your visit at the Smithsonian Information Center's Associates' Reception Desk—open 9 A.M.-4 P.M. daily—in the Castle. Special materials and information on exhibitions, activities and dining await you there. Learn what's new at the Smithsonian and other capital attractions—videos, touch screens, maps and more.

Smithsonian museums are generally open 10 A.M.-5:30 P.M. daily, except December 25. Receive a free Associates' planning packet: write to Smithsonian Information, Washington, D.C. 20560, or call 202-357-2700 (voice) or 202-357-1729 (TTY), 9 A.M.-5 P.M., Monday-Friday; 10 A.M.-4 P.M., Saturday-Sunday. Note: Parking on the Mall is limited; Metrorail (subway) is convenient to most museums.

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ARTHUR M. SACKLER GALLERY

Roy Lichtenstein: Landscapes in the Chinese Style (through February 7) Paintings by the American pop artist shown with six of the Chinese works that inspired him.

FREER GALLERY OF ART

Beyond the Legacy: Anniversary Acquisitions for the Freer Gallery of Art (through March 14) One hundred gifts and purchases in honor of the gallery's 75th anniversary.

Arts of the Islamic World More than 60 examples of Koran pages, metalwork, ceramics, glass vessels, paintings and calligraphy from the 9th to the 17th century mark the Freer's collection of Islamic art as one of the world's best.
Whistler and the Leylands (through June 30) Etchings and drypoints that Whistler made between 1867 and 1876.
Ancient Chinese Mirrors and Belt Hooks The first Chinese bronzes collected by Charles Lang Freer.

NATIONAL MUSEUM OF AFRICAN ART

South Africa 1936-1949: Photographs by Constance Stuart Larrabee (through February 28) Seventy-nine black-and-white photographs capture a decisive period in South Africa's turbulent history.

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[NEW YORK CITY]

Unlimited by Design (through March 21) The first major exhibition of products, services and environments designed to meet the needs of people throughout their life spans, from toddlers to seniors.

NATIONAL AIR AND SPACE MUSEUM

And a Star to Steer Her By The new planetarium show (fee) and an accompanying exhibition, *GPS: A New Constellation,* explore the history of navigation, from the ancient mariners to the latest satellite technology.
Star Wars: The Magic of Myth (through January 31) For information on limited free same-day passes, call 202-786-2122. Advance tickets can be purchased through ProTix (800-529-2440).

ARTS & INDUSTRIES BUILDING

Communion of the Spirits: African American Quilters, Preservers and Their Stories (through March 30)
Discovery Theater Live theater for youngsters. Call 202-357-1500 (voice or TTY) weekdays, 8 A.M. - 4 P.M.

NATIONAL MUSEUM OF AMERICAN ART

Art of the Gold Rush (through March 7) Paintings, watercolors, drawings.
Silver and Gold: Photographs of the Gold Rush (through March 7) More than 100 daguerreotypes.

NATIONAL POSTAL MUSEUM

Mayhem By Mail Explores three categories of crime investigated by U.S. Postal Inspectors. Objects include a mail bomb and a tommy gun.

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As Precious as Gold The importance of letters from home during the Alaska/Klondike gold rush.
What's in the Mail for You! High-tech interactive exhibition about the direct mail industry.

ANACOSTIA MUSEUM

Classic Black (through April 30) Rare photographs of African-American ballet dancers from the 1930s to the 1960s.

HEYE CENTER NATIONAL MUSEUM OF THE AMERICAN INDIAN
[NEW YORK CITY]

The Art of Being Kuna: Layers of Meaning Among the Kuna of Panama (through March 21) Three hundred works, including jewelry, baskets and *molas*—richly decorated blouses for which the Kuna are world-renowned.

Theodore Roosevelt in buckskins, 1885; an exhibition on the 26th President is at the National Portrait Gallery.

EXHIBITION CATALOGUES

Catalogues currently available include:
Art of the Gold Rush ($24.95 paper, $50 cloth)
Silver and Gold: Photographs of the Gold Rush ($29.95 paper, $59.95 cloth)
Theodore Roosevelt ($22.95 paper)
Philippe Halsman: A Retrospective ($75 cloth)
To order, send check or money order to Smithsonian Museum Shops, 8308 Cinder Bed Road, Lorton, Virginia 22079. Include 15 percent of purchase for shipping (minimum, $4.50).

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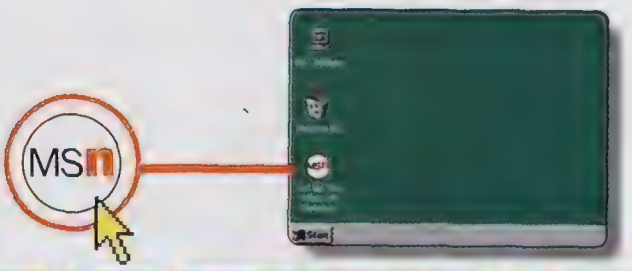

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CASTING A HIGH-TECH NET FOR

Space

BY JAMES R. CHILES

PHOTOGRAPHS BY KAY CHERNUSH

Trash

A CLOUD OF SPACECRAFT PARTS AND DEBRIS ENVELOPS THE EARTH. KEEPING TRACK OF IT TAKES THE BEST WE HAVE

ANYBODY WHO BELIEVES THAT SPACE IS AS empty as it looks in the movies should spend a few hours with Justin Kerr of NASA and Ronnie Bernhard of Lockheed Martin. It's June and both scientists have flown in from Houston to inspect the orbiter *Columbia*, which sits in Bay 3 at the Kennedy Space Center's Orbiter Processing Facility. I'm stretched out on an aluminum work platform by *Columbia*'s windshield, under strict orders not to drop pens or notebooks or wedding rings that might damage the fragile tiles below.

This antenna array in New Mexico picks up signals when anything goes through an electromagnetic "fence." Dots around Earth (above) represent a snapshot of where all trackable objects were at one moment in time.

Kerr hunkers down to my left and crawls through a playhouse-size aluminum entryway, emerging onto a catwalk with a nice view of *Columbia*'s spacious payload bay. He grasps a lab notebook and a sampling kit, including a chopstick, a bamboo skewer and an orange stick. He directs my attention to a pair of tiny dark craters, each about twice the size of a sharp pencil tip, bored into a white metal frame that holds up one of the spacecraft's antennas. Kerr uses a bamboo stick and tape to gather up the smoky residue from each of the craters. He wraps up the tape and each stick to preserve the soot for microscopic scrutiny.

A SHOUT COMES FROM A PLATFORM ONE LEVEL BEneath us: others on the NASA debris team have found another impact crater, this time on the right payload door. As we head down, I learn that NASA has logged 106 significant hits on *Columbia* from this single mission, most of them caused by unwanted man-made particles in orbit. (On most missions, minor damage means that at least one outer layer of window glass is replaced.) Bernhard is crouched under the open door, craning awkwardly to look straight overhead at the white insulated surface with a magnifying glass. He suggests I take a look. Through the tear I see goldish-brown felt that's been singed by the impact; on the white surface of the door smoky soot trails off one side.

These particular craters look pretty small to me, and I ask Bernhard if tiny but fast particles mean much. Yes, indeed, he says. During a mission in 1995, *Columbia* took a hit in a payload door that made a gash almost an inch across. If that piece had crossed into the payload bay and punched a big enough hole in the cooling system there, Houston controllers would have ordered the ship back to Earth immediately. One reason it didn't hit at a bad spot was that the NASA debris squad had predicted the risk beforehand, based on earlier shuttle flights, and suggested keeping one payload door partially closed to help shield the payload bay. Bernhard says that, from the metals found in the crater, the culprit on that mission was probably a fragment of circuit board. Where it came from nobody could say, but an explosion is likely. Space has seen its share of silent blasts, some of them quite recently; in 1996 a Pegasus rocket exploded and propelled into orbit at least 700 pieces more than four inches across.

Science writers of the 1950s vividly described the risks to future spacefarers from rocky micrometeoroids near Earth, but the prognosticators missed the boat on what has turned out as a bigger deal, safety-wise. Near Earth, artificial meteoroids now pose a greater risk than the natural stuff. Over the decades humanity has gone Saturn one better by putting up not just a ring but a spherical shell of glittery objects around the planet. It's a layer of camera lens caps, spent rocket boosters, bolts, nuts, buckets of garbage, and countless flecks of dislodged paint and particles of solid fuel from booster rockets.

Even full-sized spacecraft that can be tracked reliably with radar have begun to cross paths, causing encounters that while rare are positively alarming. During his four-month stay on the *Mir* space station, U.S. astronaut Mike Foale received three warnings of approaching space traffic. In the last incident, an obsolete American satellite called *MSTI-2* passed less than a thousand meters from *Mir*. At the request of Russian controllers, Foale interrupted his exercise-bike workout to join the cosmonauts in the *Soyuz* (a Russian spacecraft that can return the cosmonauts to Earth) for a few minutes as a safety measure in case *Mir* was punctured. "We always looked outside [during the close passes] to spot them and it was inevitably futile," he says now. "Imagine trying to see a small dot ten kilometers away over your left shoulder, and a second later it's right next to you, and another second later it's ten kilometers over your right shoulder." Much more space traffic is on the way, including hundreds of satellites that are intended to provide portable telephone and Internet access by radio

Justin Kerr, left, and Ronnie Bernhard inspect the orbiter *Columbia* for tiny impact craters after a 16-day flight. Inset, right: Bernhard uses a stick and sticky tape to sample a hole for telltale debris.

P. 47 NASA JOHNSON SPACE CENTER

the equator, and some are in polar orbit, perpendicular to the equator. A spacecraft can not only be broadsided, it can come close to a head-on collision, with each party traveling at 17,000 miles per hour.

ONLY IMPERFECT MEANS OF TRACKING ARE IN PLACE now, and there's very little control. Orbiting objects are entirely different from airliners that stay up only a few hours and obey air traffic controllers. Of the 100,000-plus objects posing a collision danger, fewer than 1 percent are satellites that can be moved around. The rest—a crowd of functioning and dead satellites and mostly bits of wreckage—cannot. Their orbits change in tiny but perverse increments from day to day under the influence of the gravitational pull of the Moon and Earth's mountain ranges (whose extra mass adds to Earth's gravitational pull), solar winds that warp the upper atmosphere and many other vexations. All these combine to keep space traffic from following precise and predictable paths.

Low orbits are self-cleaning because the smaller pieces of debris are dragged down by wisps of air and burn up in the atmosphere; but satellites in orbits above 400 miles or so can have a very long lease. The United States launched the *Vanguard 1* satellite in 1958. It's still there, and due to reenter our atmosphere in about 600 years. A high-flying satellite launched today will still be circling Earth a million years from now unless somebody sweeps up the neighborhood.

NASA has logged 106 significant hits on Columbia from this single mission, most of them caused by man-made particles in orbit.

The chances of a collision with space debris are small, considering the cloud of stuff that's up there, but they are real. All launches—commercial, NASA and of course military—are coordinated by the U.S. Space Command in Colorado Springs. When calculations show that collision with a piece of space debris is possible, the danger is avoided by closing the launch window by as little as one minute. (In that time, an object orbiting at 17,000 miles per hour will have moved 283 miles.)

The unmanned *Cassini* mission to Saturn received special care because

link sometime in the next ten years.

A small but motivated corps around the world tries to sort out the dizzying whirl and figure ways to limit damage from the inevitable hits. They talk of stopping the "silver bullet," the piece that someday will take aim directly at a spacecraft's vital parts, or the astronauts inside. A silver bullet is small enough to escape radar surveillance but big enough to destroy. "There is a possibility that you could be hit by one of those silver bullets on a bad day," Kerr says. "On that day you want to do the best you can to shield the vehicle." Most spacecraft are launched in a generally eastward direction. They do not travel due east, however, staying over the same line of latitude. Some are aimed well north of

the spacecraft carried 72 pounds of plutonium. In the late summer and fall of 1997, there would be launch opportunities for 140 minutes each day for 86 days. Day after day, the U.S. Space Command and the Naval Space Command calculated what known pieces of space debris would be where for 180 launch windows each day. On October 15, 1997, only 16 of the 180 windows were closed by the possibility of collision. The $3.3 billion space probe was successfully launched.

During a shuttle flight, U.S. Space Command performs collision avoidance calculations the whole time. On at least five occasions, the shuttle has changed its orbit to keep clear of flying trash.

THE MILITARY KEEPS TRACK OF OBJECTS DOWN TO A size of about 2.5 inches. NASA's orbital debris program, working with radar and optical telescopes, takes statistical samples down to a little less than a tenth of an inch. Below that, the shuttle spacecrafts themselves are the sampling devices.

What tracking we can do today operates within the civilian space program and classified military efforts to warn the nation against missile attack. Again and again, my visits around the tracking system reminded me that the military pays the big bills. At the Colorado Springs command center, a duty officer warned me that if an "incident" developed I'd have to leave the room immediately. At a Navy command center in Virginia, I asked about a flashing red light mounted on the ceiling. "That means we are in a degraded classification level as long as you're in here," a lieutenant told me.

Green five-digit numbers, each a space object, crawl across a silhouette of North America.

American spacewatchers use more than two dozen instruments for their traffic patrol, including exotic gear not found in any other branch of astronomy. I found one of the network's big eyes staring due north from the plains of eastern North Dakota, at Cavalier Air Station.

Four long green crates here offer a clue about the full-time job of this building. They're stacked on the concrete floor. Each crate holds a ten-foot-long vacuum tube for the Perimeter Acquisition Radar. Originally built as an early-warning set for the Army's "Safeguard" antiballistic missile system of the 1970s, the array still probes the northern skies night and day for the Air Force's 10th Space Warning Squadron. Its 6,144 antennas make a silvery sheen that adorns one flat face of this blocky building like a vast medallion. The radar, 110 feet high and sloped so it points into the sky slightly over the northern horizon, is not your ordinary revolving dish-type radar. Without moving an inch, this one uses tricks of electronics and computers to watch hundreds of objects at a time within its broad field of view. Or it can blast the whole 25-megawatt beam at a dim object to get a bigger blip.

Lt. Andy Olson, right, and Canadian counterpart Capt. James Bell stand watch at Cavalier Air Station in North Dakota.

According to Cavalier's fun-facts list, its radar could spot a basketball in space 2,000 miles off and it uses more electricity than a small city. I was even more impressed with what Airman Mike Aubin tells me in a stairway: according to the regulars around here, a piece of steel wool dropped down the face of the radar will flash into flame. Aubin has the title of crew chief on his shift when I visit the station, but the Missile Warning Operations Center only has two-man crews and his crewmate is Lt. Brad Sumter, who outranks him. (Both Aubin and Sumter have been transferred since my visit.)

Aubin sits me down at his radarscope so I can see what he does for a living. It's a large round monitor of the size that I've seen at air traffic control centers; green five-digit numbers representing space objects crawl across a silhouette of North America. The U.S. Space Command assigns the numbers consecutively in permanent fashion to every new trackable object. The *Mir* space station wears number 16609. Only 8,500 of all the 25,500 objects ever cat-

The 6,144 small antennas on the wall of this North Dakota building constitute a radar that could detect a basketball 2,000 miles up.

alogued are still in space now. The rest have burned by falling into the atmosphere. The men tell me that I should have visited last weekend, when a spacecraft blew up and scattered 20 more parts into orbit.

Another part of the sprawling space surveillance network is run by landlubbing Navy people and their contractors. If you had radiosensitive eyeballs you could see the "Fence" running along the entire southern tier of states, from the Georgia coast all the way to Southern California. It is an invisible wall of energy that reaches tens of thousands of miles above Earth. Like a continental-size burglar alarm, the system bleeps every time an object like a satellite or piece of debris flies through and reflects its radio waves. Using signals from the six receiver stations, computers in Dahlgren, Virginia, calculate the position for each crossing of the Fence. It has picked up objects as far east as Africa and as far west as Hawaii.

Twenty miles from a paved road in southern New Mexico, I gain entrance through a remotely operated security gate and park my car at a single-story building painted battleship gray. I find technician Manny Sanchez monitoring a row of digital readouts from the Fence. Sanchez got his training in communications from the Army.

The business end of the operation is a short walk from the building. Sprawling across 200 acres, the station operates 19 receiving antennas. Each is head-high and looks like a galvanized grape arbor running for thousands of feet.

Back in the building, I ask how things are going, and Sanchez consults a computer printout. In the past 24 hours the receiver has counted 29,773 objects crossing the Fence within its viewing range; some of the objects are coming through again and again.

Mark Mulrooney gently rotates the mercury mirror at NASA's Orbital Debris Observatory in Cloudcroft, New Mexico.

"The job is the same from year to year," he says, "except that there's a lot more of the objects now."

A lot more, indeed. Carroll "C.C." Hayden remembers just how sparse space traffic used to be. Approaching retirement now, he's a program manager for the space surveillance system's nerve center in Dahlgren.

I ask about a faded plotting diagram leaning against the wall in Hayden's office. He tells me that in the early

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days of the space program, mathematicians read off signals from strips of recording paper. They pushed pencils and slid slide rules and marked each satellite's passage on a plotting chart like the one Hayden still keeps. On June 29, 1961, in what appears to be the first explosion in space, a leftover rocket body blew up and scattered a cloud of debris. Technicians had strip charts stretched all over the room trying to keep up with the blips, Hayden recalls.

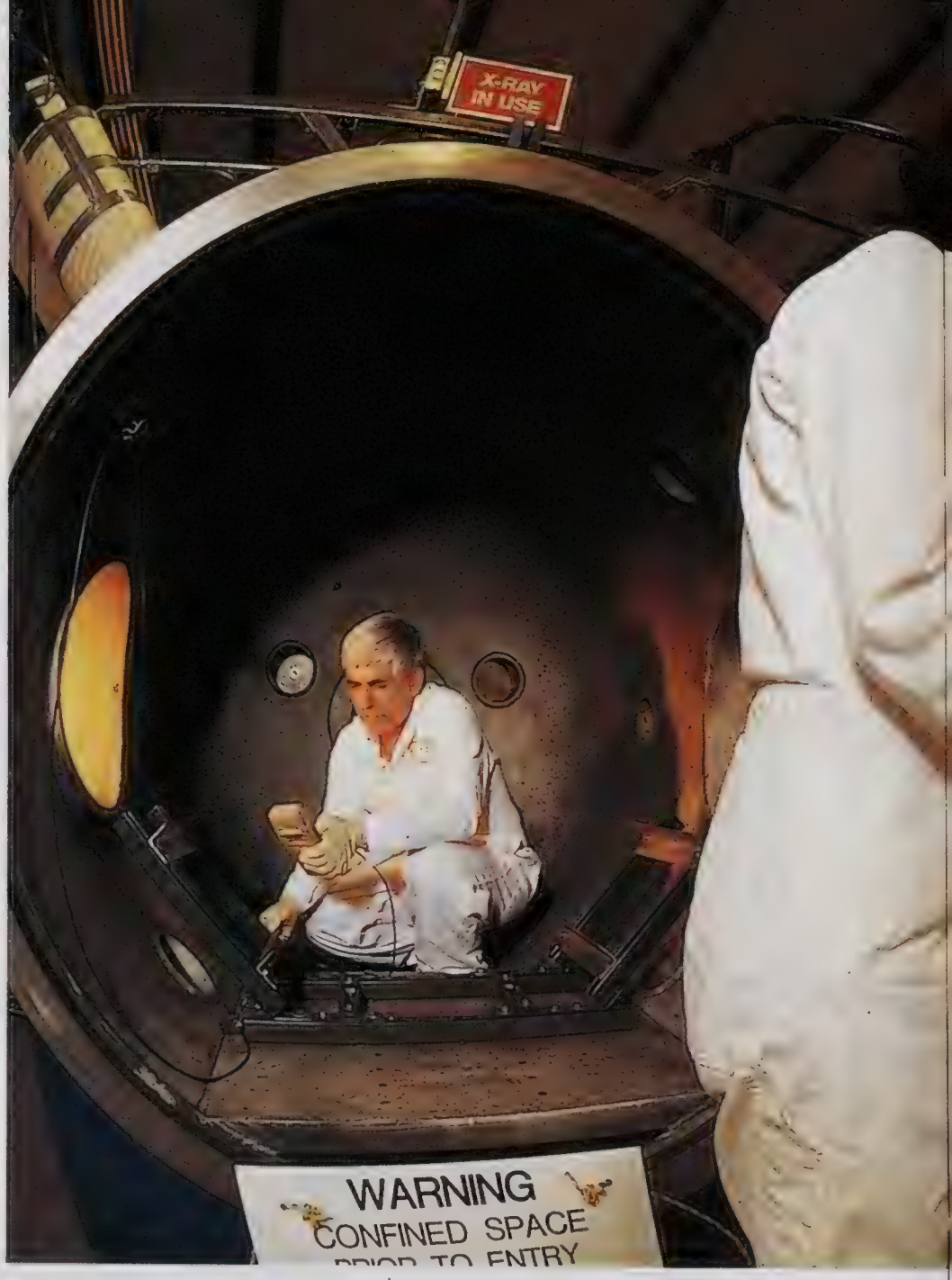
IN THE YEARS FOLLOWING, THE MILITARY ADDED more ears and eyes to its space surveillance system, such as sets of telescopes planted in New Mexico and on islands in the Pacific and Indian oceans. This Ground-Based Electro-optical Deep Space Surveillance System collects orbital information about satellites too high for the Fence and for most of the big radar sets to detect, such as those in geosynchronous orbits 22,300 miles up.

While the U.S. Space Command specializes in larger objects, some workers are genuinely concerned about smaller but more numerous pieces of debris, which don't reflect enough light or radio waves to be tracked from the ground. These chunks, which range in size from a softball down to a pebble, are a lethal hazard because mission controllers won't have any warning to get spacecraft out of the way and because there are so many bullets in this shooting gallery—some estimates run to 400,000. "Getting hit with one of these is a lot more likely than getting hit by lightning down on Earth," says Jon Boers of the U.S. Naval Space Command.

The mirror can see one-inch objects in low orbit; some are less than a half-inch.

This is where NASA comes in. For low-earth-orbit flights it estimates the current traffic hazards in space and prepares statistics to weigh the risk. Other telescopes funded by NASA survey space for pieces that are too small for military radar to detect (roughly the size of a softball and less) but still big enough to knock meaningful holes in low-orbiting spacecraft. I meet project scientist Mark Mulrooney at one of these debris-counting telescopes on a Saturday evening in June in the wooded mountains near Cloudcroft, New Mexico.

Mulrooney stops me at the dome entrance and goes in first, waving a gas-sampling wand to check for hazardous levels of mercury vapor. Instead of the usual aluminum-coated glass, the telescope's main mirror is a wafer-thin film of liquid mercury sitting inside a shallow round dish. Almost ten feet in diameter, the dish rotates silently on a



Michelle Baragan mounts International Space Station armor in a hypervelocity gun. Lenwood Farnell calibrates the sensors.

cushion of air. The slow spin pushes the surface of the 500 pounds of mercury into the precise curve needed for an astronomical mirror. A liquid mirror can only point straight up, but that's fine for the job here, which is statistical sampling of the ever-changing debris population. Small fragments rain down into low-earth orbit from higher altitudes as their orbits decay, so each new shuttle mission meets a new population of debris at its flight altitude. Mulrooney says the liquid mirror in Cloudcroft can see one-inch objects in low orbit, and he predicts the latest observations will show some less than a half-inch across.

Another worker in NASA's spacecraft-protection effort is Ed Denzler, a transplanted New Yorker now living in New Mexico, who is lead technician at the White Sands Hypervelocity Impact Test Facility.

While Denzler bustles about to set up the day's shot, which will try out another set of armor intended for the International Space Station, NASA program manager Michelle Rucker guides me around Building 272. (She, too, has since left.) She walks me down a long string of sturdy blue metal tubes and tanks mounted on a set of steel girders. Running the full length of the building, this is the lab's biggest gun. Each shot uses up to 3 1/2 pounds of gunpowder. For reasons that go over my head, none of these

Michelle Rucker (below) inspects damage caused by a half-inch sphere hitting a sheet of aluminum at 15,000 miles per hour.

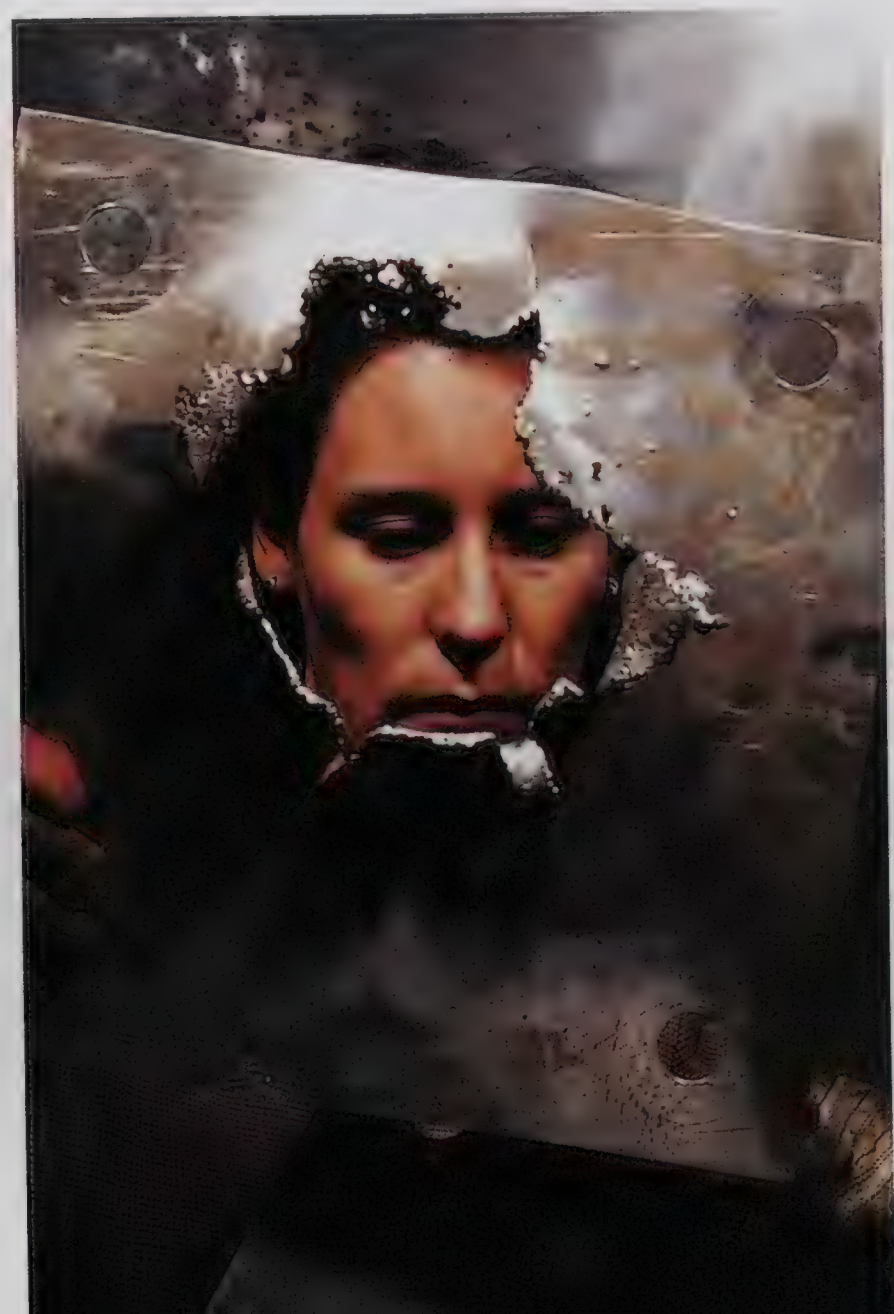
"light gas guns" can fire bullets faster than about 22,000 miles per hour, and such speeds are so hard on a gun that the barrel lining has to be scrapped after every shot. At the more typical speed of 14,000 mph, the big gun can fire 20 to 30 half-inch projectiles before needing an overhaul. (A bullet fired from a deer rifle moves at something like 2,000 mph.)

THE BIG GUN AND ITS SMALLER BRETHREN FIRE LITtle pellets of plastic and metal to test the latest spaceship armor. A one-ounce hunk of plastic launched from the big gun will blast a baseball-size hole through an inch of carbon steel. NASA has learned that astronauts' best hope if an impact occurs is something called a "Whipple shield" after inventor (and Smithsonian astronomer) Fred Whipple. Rucker shows me a set of armor made up of ceramic, Kevlar and metal sheets with spaces between them. When a projectile moving at many thousands of miles per hour hits one of these sheets, it runs into the shock waves it itself causes; the shock waves have not had time to "get out of the way." The shock waves actually break up the projectile, turning it into a molten spray that splatters on an inner shield. A thick slab of metal would not work nearly as well as these seemingly fragile layers.

Providing vehicles with the latest debris-fighting armor can bring some peace of mind, but prevention counts for more. Spacecraft designers are building in vents that dump leftover fuel into space after launch, reducing the risk of accidental explosions that have scattered so much debris. Separations between rocket stages and payloads now rely on mechanical releases rather than shrapnel-producing explosive bolts. Companies parking communication satellites into precious geosynchronous orbits are promising to leave enough fuel at the end of the active life to boost the satellites into higher "graveyard" orbits that free the slots for replacements. Defunct satellites closer to Earth will be nudged downward with the last dregs of fuel for immolation in the atmosphere.

It's a strange jumble of hazards we've left up there: museum artifacts and precision instruments mingling with garbage and scrap. Until we find a way—giant lasers, perhaps—to clean it all up, the future will be dealing with our spaceborne past.

Minnesota-based James Chiles has written for SMITHSONIAN *on flying cars,* Voyager 2, *flight simulators and air traffic controllers. Kay Chernush, who often works overseas for* SMITHSONIAN, *says she sometimes felt she was in the Twilight Zone while shooting this story.*



the changing face of STONE Mountain

IN THE SHADOW OF A TOWERING CONFEDERATE MEMORIAL—AND A DIFFICULT HISTORY—A SMALL GEORGIA TOWN LOOKS TO THE FUTURE

BY MINNA MORSE

PHOTOGRAPHS BY MAGGIE STEBER

FROM MY ATTIC ROOM IN THE VILLAGE Inn, I can hear a train rumbling by, right through the heart of town, its whistle blowing. It comes every couple of hours, chugging past on its path along Main Street. Through my window, I have a clear view of that street, the town's historic center, with its row of quaint shops, a processional of hanging begonias, and—looming behind it—the great granite dome that gave this small Georgia town its name: Stone Mountain.

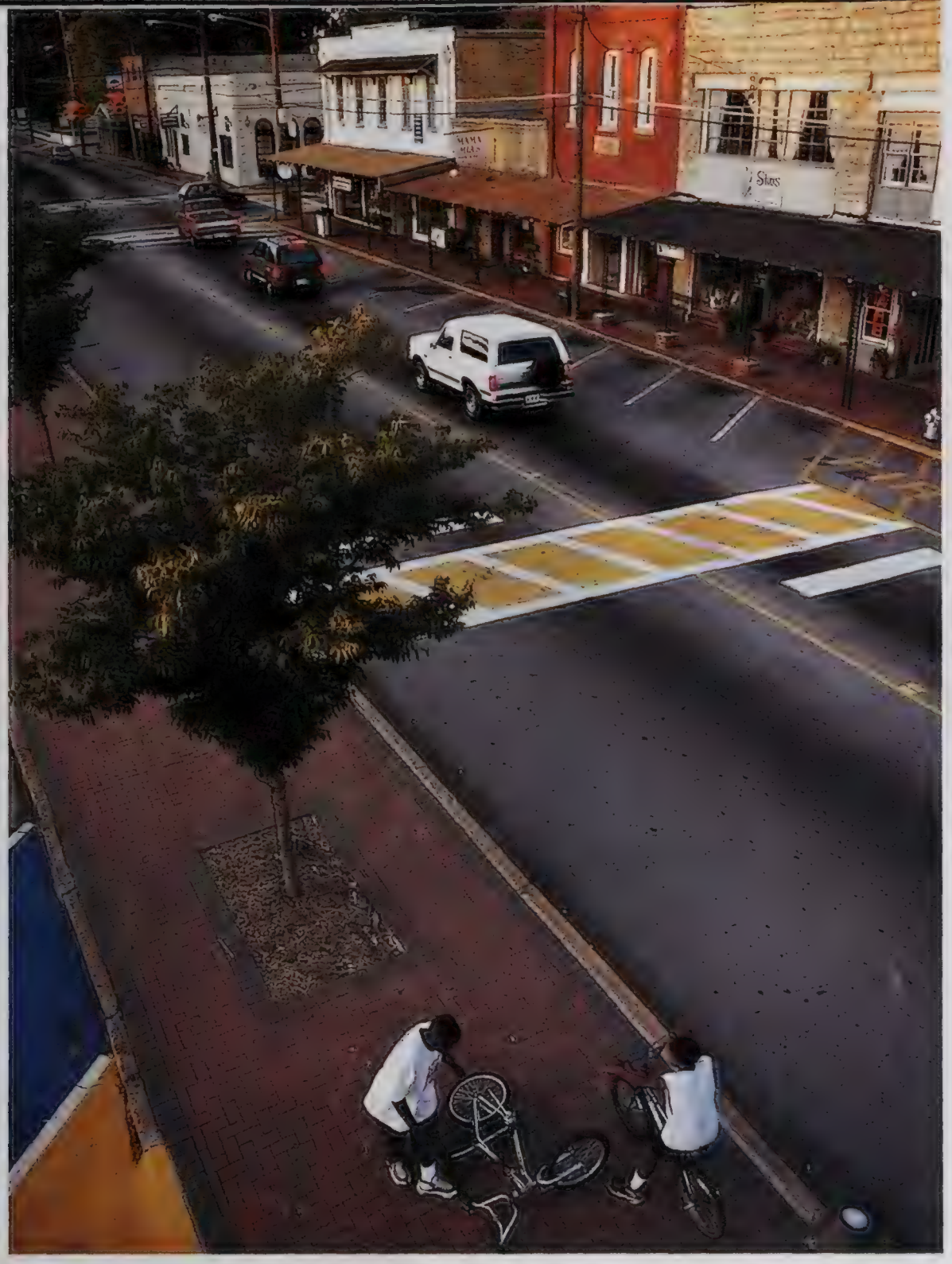
The original train tracks, I'm told, were destroyed by General Sherman during his campaign against Atlanta, which lies just 16 miles to the west. The tracks, along with much of the town, were rebuilt in the years that followed the Civil War—and since that all-too-literal Reconstruction, very little seems to have changed here.

But this tiny village has been attracting a good deal of attention this past year, for an event that many say shows just how much things *have* changed. It is an event that might otherwise seem commonplace, particularly these days, particularly in the South: the election of a black mayor. But this election, in this town, is inescapably laden with symbolism.

Just over 75 years ago, on the northern face of Stone Mountain, the artist who would later carve Mount Rushmore began what became the largest bas-relief sculpture in the world: a 90-by-190-foot memorial to the Confederacy, featuring the likenesses of Jefferson Davis, Robert E. Lee and Thomas "Stonewall" Jackson.

That same year, in 1923, the owner of the mountain granted an easement to the Ku Klux Klan to hold rallies on the mountain's summit, the same spot where, eight years earlier, the

Chuck Burris (above, left) is the new mayor of Stone Mountain, which sits at the base of the historic granite dome (above) that gave the town its name.



Main Street, once the site of Ku Klux Klan pilgrimages, is the historic heart of Stone Mountain's thriving and increasingly diverse community.

Klan had staged its 20th-century rebirth. For the next 60-odd years, the KKK held annual rallies at Stone Mountain, first on the mountain itself, and then in the village.

"I remember too well that speech of Dr. King's," says Michelle Kourouma, executive director of the Atlanta-based National Conference of Black Mayors. "'Let freedom ring,' he said, 'from Stone Mountain of Georgia.' That wasn't an accident, mentioning that town. That they've elected a black mayor . . . that's something I never thought I'd see in my lifetime."

But those who have long called Stone Mountain home—both black and white—insist that the town's history of smooth relations between the races belies the appearance of hatred and violence that the Klan's rallies projected to the world. "This is just where the Klan marched," declared one shopkeeper on my first day in town. "Those people weren't from here. Can't we just put this in the history books where it belongs?"

Chuck Burris, the town's new mayor, would like nothing better. He is hoping that the world will begin looking at Stone Mountain differently now—not as a symbol of racial hatred, but as a symbol of racial healing. Last January, the White House had similar thoughts (though the issue of race relations, so dear to President Clinton, was quickly being overshadowed by a burgeoning scandal). Just weeks after Burris' inauguration as mayor, he was invited to sit with Hillary Clinton during the President's State of the Union message.

While in Washington, D.C., Burris sought advice on historical interpretation from the Smithsonian—because, he explains, while he's happy to put the past "into the history books," he doesn't want to sweep it under the rug. "This area is rich in history," he says. "Some of it is painful to many people. I want to deal with those facts in a way that people can profit from."

And profiting from history—in every sense—is of great concern to the folks in this town.

The village of Stone Mountain sits at the border of the 3,200-acre Stone Mountain Park, a huge tourist attraction—with the Confederate Memorial as its centerpiece—that draws more than four million visitors each year. Once upon a time, the lifeblood of this community was the granite industry. Today, the town thrives on tourism. With the proximity of the park, the village shops, and the ambience of the Old South, the hamlet of Stone Mountain has become a travel destination in its own right.

On Main Street, where there was once a hardware store and a pharmacy, today there are only restaurants and shops selling clothing and knick-knacks. The necessities are to be found on Memorial Drive, the commercial thoroughfare that borders Stone Mountain and connects it to downtown Atlanta.

There is more, of course, that connects the two. With a relatively low cost of living and a booming local economy, the Atlanta area has seen its population grow by half a million since 1990; nonwhite ethnic groups, largely African-Americans, represent a quarter of that growth. Suburban De Kalb County—where Stone Mountain is located—has been hailed as a mecca for affluent and middle-class blacks. In 1990, the county's African-American population was

already reaching 50 percent; since then, it has no doubt passed that. And Stone Mountain has been quietly catching up.

"In 1991," Burris tells me, "15 percent of the registered voters here were African-American. As of last year, it was 50 percent." I'm meeting with Burris in City Hall, which is housed on Main Street in the town's old, granite depot. As a train rushes by the window, the mayor pauses.

"This is where the Old South and the New South meet," he continues, with a satisfied smile. He moved here about ten years ago, both for the small town feel, he explains, and for what appeared, even then, to be a robust and increasingly diverse community. "I was out here looking for a house, and I saw some kids playing together—Asian kids, African-Americans, some of European descent. It seemed like the perfect town."

But that didn't keep Burris from trying to perfect it further. Shortly after moving to town, he ran for city council. Burris, now 47 and a computer consultant, had worked in the 1970s and '80s as a crime and budget analyst under Maynard Jackson, Atlanta's first black mayor. After becoming a Stone Mountain city councilman in 1992, he began rallying for a survey of the town's historic sites. "There was a wealth of history here, and we were missing it. We knew of maybe 50 historic buildings. The survey found 255. Fifty-five were in Shermantown, the historically black neighborhood." Burris went on to champion legislation to upgrade police equipment, improve budgeting practices and increase funding for parks—among countless other efforts.

"Chuck had such good ideas," says longtime white resident T. J. Weatherly. "He did more on that council than any other member in my memory." The septuagenarian smiles. "And I've got a *long* memory."

The new mayor hopes that the world will begin looking at Stone Mountain differently now—not as a symbol of racial hatred, but as one of racial healing.

Weatherly, who once owned an appliance store on Main Street, now chairs an organization called Concerned Citizens of Stone Mountain. "Burris was simply the most qualified candidate for mayor," he says, offering as proof all that Burris has accomplished so far in office. "He's begun laying the sidewalks that the old mayor promised but never got around to, he's launched a campaign against drugs—I think he closed two crack houses." The gentlemanly Weatherly shifts in his seat. "Not that we've got more of a drug problem than other towns, but we have one. And Chuck is tackling it."

Burris received biracial support in the '97 election, a close contest that the press called "conspicuously unmarred by racial rhetoric." "The former mayor was very popular," confides one white merchant who supported Burris. But the new part-time mayor, the merchant suggests, takes a more proactive approach to the town's needs and its changing demographics. "Of course, some people are bothered by him, or by his wife, Marcia." Mrs. Burris, an exuberant and straightforward New York native, clearly rubs some Southerners the wrong way. "How much of that is race, how much is the fact that they just do things differently? You can never really know for sure."

The resistance to people who "do things differently" is not surprising. This is a town whose longtime residents are, for the most part, politically conservative, deeply religious (there are at least ten churches in this village of 7,000), and steeped in Southern tradition. Folks still call two of the McCurdy women, doyennes of an old Stone Mountain family, "Miss Alice" and "Miss Myrtice." But there are also signs of modernity: a thriving arts center, for instance, that has risked the occasional controversial show in its gallery. And while the village proper is mostly white—except for the small, historically black neighborhood—the developments that stretch out from the town's core seem thoroughly, and happily, integrated.

Grace Byrd, one of the few African-American business owners along Main Street, is among those who are creating the new face of Stone Mountain. She and her husband, both in their late 30s, moved to the Atlanta

For 60-odd years, the Ku Klux Klan held annual rallies at Stone Mountain.

UPI/CORBIS-BETTMANN

A relative newcomer to Stone Mountain, Mayor Chuck Burris relaxes at home with his wife, Marcia, right, and stepdaughter Dieynaba.

area because of the low cost of housing. Attracted to Stone Mountain for its growing African-American population, and unintimidated by the predominantly white business district, she set up her store, Silver and Lace, across from City Hall. At this point, only two other black shopkeepers belong to the Stone Mountain Village Business Association, but Byrd expects to see that change. Asked about the town's unusual history, she says: "People who were born and raised here are very aware of the history, and sensitive about it. But most people who came here recently didn't know about the KKK marching here, and they don't care. That's over now." Brightening, she asks, "Have you been to the park yet?" Not intimidated, either, by the symbolism there, Byrd and her husband think the proximity to the mountain is one of the area's greatest perks.

Stone Mountain Park is indeed a beautiful place, with miles of hiking and biking trails, a petting zoo and lakes with old-fashioned riverboats. And, of course, there is the mountain itself, with its long, strange history.

Once home to Cherokee and Creek Indians, Stone Mountain became, in the 1800s, home to a network of granite quarries. In 1887, brothers William and Samuel Venable began buying up the mountain, employing most of the town in the quarrying trade. Then, in 1915, events conspired to make more of Stone Mountain—in the public's mind—than just a source of granite.

First and foremost, there was the movie *The Birth of a Nation*, D. W. Griffith's romanticized account of the short-lived Reconstruction-era Ku Klux Klan. Based on a novel called *The Clansman*, Griffith's film took the country by storm in 1915 and fanned the flames of Southern pride. That same year, a man named William Simmons decided to re-create the Klan for modern times—devoted, as was its predecessor, to the principles of white supremacy, Protestantism and the sanctity of Southern white womanhood. On Thanksgiving eve, Simmons and a group of 15 men—including Sam Venable and his 13-year-old nephew, James—climbed to the summit of the Venables' mountain. There, one week before the Atlanta release of *The Birth of a Nation*, they donned bedsheet robes and pointed masks and lit a huge cross of pine.

Also in 1915, the United Daughters of the Confederacy hired sculptor Gutzom Borglum (SMITHSONIAN, August 1992) to create a monument to Confederate heroes in the granite of Stone Mountain. Upon seeing *The Birth of a Nation*, Helen Plane, president of the UDC's memorial associa-

tion, wrote to Borglum, suggesting that the Klan ("which saved us," she wrote, "from Negro domination") be immortalized in stone as well.

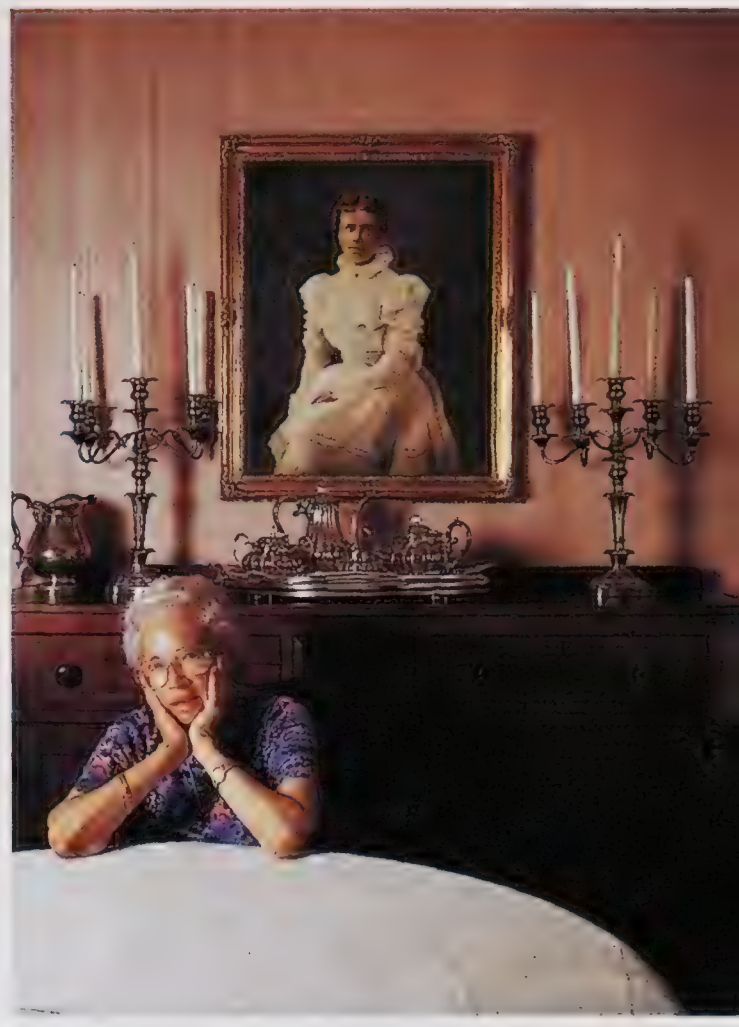
Borglum, who became a Klansman himself, never completed his project, with or without a depiction of the Klan. Work was delayed for lack of funds until 1923—the same year that Sam Venable gave the Atlanta Klavern permission to hold annual rallies on his mountain. Soon thereafter, Borglum and the project's backers had a falling out. Borglum destroyed his plans, fled town and went on to carve Mount Rushmore.

Venable had given the UDC until 1928 to complete the project, but their next sculptor—Augustus Lukeman—couldn't meet the deadline. The project was abandoned until 1958, when Georgia, in the midst of its battle against desegregation, bought the mountain and moved forward on the memorial. In 1964, another sculptor went about finishing Lukeman's carving. Hovering 400 feet above the ground, the huge memorial—depicting Lee, Davis and Jackson on horseback—was finally completed in 1970. At the unveiling, Vice President Spiro Agnew, an unpopular substitute speaker for President Nixon, nonetheless received cheers when he declared that "just as the South cannot afford to discriminate against any of its own people, the rest of the nation cannot afford to discriminate against the South."

Since then, the park has slowly been taking measures to answer both of those imperatives. Tour guides no longer wear gray uniforms, nor do actors portray slaves on the park's reconstructed antebellum plantation. The popular laser show, which attracts thousands each night to the lawn below the memorial, has changed as well. Once riddled, I'm told, with Confederate symbols, the show now contains few. Instead, it has become a crowd-pleasing mishmash of brash commercialism, political correctness, silliness, and—geared toward a diverse audience—nearly equal measures of soul and country music.

The night I was there, I asked a black woman sitting next to me what she thought of the park. "Oh, there's so much to do," she enthused. "And the kids love the laser show." Had she ever been to the plantation attraction? I asked. "Nope," she said curtly, enthusiastic no more. "Never have."

There is a television advertisement for Stone Mountain Park, highlighting the variety of activities and sights, that ends with the slogan "Stone Mountain: A Different Day for Everyone."



Longtime residents Charlie Nash (a Civil War buff), Gloria Brown (center) and Myrtice McCurdy have had very different experiences here—but all are proud to call this home.

Congregants join in song at Bethsaida Baptist Church on Fourth Street in the heart of Shermantown, Stone Mountain's historically black neighborhood.

For retired communications worker Charlie Nash and his buddies, the day begins at 6 A.M. with a hike up the steep 1.4-mile trail to the mountain's summit. Every day, for more than 10 years now, members of the "6 A.M. Mountain Climbers" have gathered at dawn on the west side of the mountain. Today, I've been invited along.

"There's a steep route, a steeper and a steepest," someone says as we head off into the twilight, assuring me that we're taking the least steep trail. Along the way, a hiker points out the names and designs carved into the rock. Near the bottom there are countless names of sweethearts, mostly of recent vintage; as we climb, the designs get more elaborate, the dates go further back in time. At the top, we're finally able to take a well-earned rest on the cool stone.

It is quiet, and breathtakingly beautiful. To the west, I can see the skyline of Atlanta through the haze, and to the east, the flaming red ball of the rising sun. At this moment, with the Klan very much on my mind, it's hard for me not to imagine the crosses that once burned here. But it's a subject I'm not about to raise, particularly with Charlie Nash.

I met Nash on my first day in town, when I wandered into his store, Stone Mountain Relics. On the door is a carving of the Rebel flag.

"Burris brought all these newspeople down here, looking for a story on the KKK," Nash complained to me that day. "On TV, they'd show footage of the KKK and then cut right to a shot of my door. They didn't even mention that this was a Civil War relics store, or that I have a museum upstairs."

On the way down the mountain, Nash recounts for me a popular misconception about its geology, reminding me, without meaning to, of his and others' exhortations that despite the KKK rallies here, racism wasn't prevalent in Stone Mountain—or, at least, no more than anywhere else in the South. "The granite goes right to the core of the earth," he tells me as we trudge through a slightly wooded area, "and it is spread all over the South, just below the surface."

"This," he says, "is just where it became exposed."

At the base of the mountain, I'm invited for coffee at the hikers' official "clubhouse"—at the Old Post Office Southern Buffet on Mountain Avenue. As I walk into the room that used to be the postmaster's office—and now bears a sign that reads "Redneck Club. Members Only"—a smile spreads across one of the older guys' faces. "Welcome to Mayberry," he croons, repeating what seems to be a nostalgic refrain around here, a wistful hearkening back—among the town's older, and white, citizens—to the way things used to be.

"Back when Randolph Medlock was mayor," someone begins to say, "we used to have street dances over on Main Street. And who would you see out sweeping up afterward, but the mayor himself.

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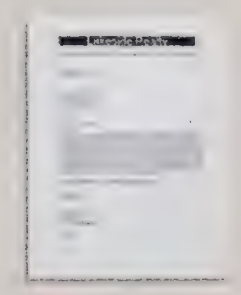

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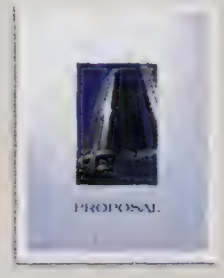

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That's just the kind of guy he was."

"Not like Burris, with this trip to Washington," someone else offers, and apparently no more needs to be said. Just as I was coming to town, a controversy brewing over Burris' trip for the State of the Union message had come to a head, with council members accusing him of inappropriately using city funds to pay for his wife and daughter to accompany him. Though Burris put the controversy publicly to rest, it had become a hot topic of conversation—and fodder for suspicion—among many in town.

"It's not that he's black," Nash tells me later. "You know, I lived in the Dominican Republic for years. Everyone down there is black; I've got no problem with them. I love Dominicans." Nash says that his wife, Nan, used to be a Camp Fire Girl leader, and there were always black girls in her troop. "She didn't treat them any different from our own."

For many, the memory of the war provides a sense of pride and belonging. Slavery is a piece of the picture they'd rather forget.

Charlie and Nan have a long history in this town. Though he has lived overseas a good deal, Nash has always come home to Stone Mountain. He even remembers taking Nan on their first date here, back in the '50s; it was a hayride around the base of the mountain, he tells me.

Chuck Burris also recalls taking a date to Stone Mountain. Burris was still in college then; his date was the woman who would later become his first wife. They were enjoying a romantic picnic when a white guy in a pickup tried to get their attention. At first they were wary. But it turned out that he wanted to warn them. It was Labor Day weekend, he explained, the date of the Klan's annual pilgrimage to Stone Mountain.

Back then, in the early '70s, though Klan members visited the park on Labor Day weekend, their rallies no longer took place on the mountain itself. After the state of Georgia purchased the mountain and surrounding area, Sam Venable's nephew, James—who'd grown up to become an attorney, onetime mayor of Stone Mountain, and the founder and Imperial Wizard of the National Knights of the KKK—had moved the annual gatherings to a pasture at the southwest corner of Shermantown, the village's black neighborhood.

Once a year, hundreds of Klan members rode down Main Street, then through the narrow residential streets of Shermantown, and burned 60-foot-high crosses in Venable's field. Venable sold the field in 1984, but the rallies continued—albeit with diminishing attendance—until 1991.

"Venable was an interesting character," Burris tells me as we sit with his wife, Marcia, in their living room. "He was well regarded by blacks and whites alike. He gave Shermantown its own park. But he also promoted the Klan's racist, anti-Semitic, anti-Catholic dogma."

When Burris was first running for city council, he came across an elderly man sitting out in his carport. "He seemed curious, so I went into my spiel. When I was done, he said, 'You know what, I'll vote for you.' The man was Venable. I don't know if he'd ever voted for anyone of African descent before in his life. But he even let me put signs in his yard."

For the past two years, that yard has belonged to the Burrises, who bought the house from the Venable family three years after the Imperial Wizard's death. The couple—who clearly revel in such ironies—also seem very aware of the opportunity that Burris' recent election provides: both for Burris, who is a born politician, and for the town and the image that it projects.

First there's the matter of running the city: sidewalks, schools, services—and business. ("At some point folks don't see black or white," Burris coos, "just Treasury green.") But he's also concerned about the town's image, and its history: "This should be a place where everyone can come to the table," he says, citing not just black and white residents, but the numerous Hispanic and Asian families who live here. "The place has a

The Stone Mountain city cemetery contains the graves of many fallen Confederate soldiers, as well as those of other town residents, white and African-American.

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tricky history—hell, one of the older developments here was built on a Native American burial ground. We've got to take a careful, respectful look at the past, in a way that educates and helps heal old wounds."

He remembers a case in point. "I really ticked off the Sons of Confederate Veterans before the Olympics. Folks were going to be flocking here, so the Sons wanted to fly a Confederate flag over the cemetery. I voted it down. There are black folks in this town who have relatives in that cemetery, too, and I'd be damned if I was going to allow that flag to fly over their graves."

Marcia chimes in, smiling, "He called them a bunch of Yankees."

"I told them, 'You're all Yankees to me, anyhow,'" he says, getting up with a grin. "'Cause I'm from Louisiana."

"Don't get me wrong. Southern soldiers fought with the same commitment and patriotism as Union soldiers," Burris says from the front door, his fourth cigarette break in an hour. "But the myths that get carried down—that slaves were happy, that the war wasn't about slavery . . . " Rolling his eyes, he stomps out his cigarette and comes inside.

"People think the flag is about slavery," Charlie Nash tells me as we drive along Covington Highway. He is taking me on a tour of the places where he says Sherman's armies camped—places where he's found enough forks, bullets and buckles to prove it. "They think the war was about slavery. Only 5 or 10 percent of Southerners even *owned* slaves."

"The war," Nash contends, "was more about states' rights."

Nash's statistics are off—in the Stone Mountain area alone, a good third of the households in 1860 owned at least one slave—but the argument is a familiar one. For folks like Charlie, the memory of the war provides a sense of pride and belonging, of duty and honor. It feeds a Southern regionalism that is as strong today as ever. The question of slavery, apparently, is a piece of the picture they'd rather forget.

"People here take care of each other," Hilda assures me, and I know she means both black and white.

But for others, it is a subject not so easily forgotten.

Nash and I are back in town, driving a few blocks south of Main Street, along Fourth—the site of Burris' new sidewalk construction and the edge of the town's most depressed neighborhood—when he begins to explain yet another Sherman connection to Stone Mountain. "Story is that Sherman camped right here," Nash says, "and sent out soldiers to free the slaves." The neighborhood we're in, with its tiny ramshackle homes, was apparently dubbed Shermantown by the grateful freed blacks who settled here. Until quite recently, say the last 15 or 20 years, this was the only African-American neighborhood in Stone Mountain. It remains home for many.

Gloria Brown, 58, still lives in the same well-kept, tiny white house on Third Street where she lived as a child. "My grandfather built that house in 1917," she tells me over coffee at her favorite haunt, the Waffle House out on Memorial Drive.

"It's about time the city put those sidewalks in," she says. "Children have to walk that route to the elementary school on the other side of town"—past Venable Street, I note, which forms the northern boundary of Shermantown.

"Say what you will about Venable," Brown says. "But he did give a lot to this town. And I have to say I even respected him: at least you always knew what he thought." And despite the one day each year when the townspeople had to watch Venable's Klan cronies come through, she asserts, "We didn't really have a racial problem, compared to other places.

"When I was a girl, I'd play ball with white children in their yards. And now, if anything happened to me, I know there'd be lots of people—black and white—offering to help."

Which, of course, doesn't mean there was no racism. "Society was racist," says Brown. "I had to ride past three white high schools to get to mine. The relationship was set: we knew how far we could go, and we didn't go much further." And that meant, she admits, not venturing into the homes of the white children whose yards she played in.

In the early '70s, when a Main Street funeral home tried to build a crematorium in the heart of Shermantown, Brown and her neighbors finally fought back. "That's when we decided to get a black elected to city council," says Brown. She smiles. "So don't you think Burris was the first."

Chuck Burris, for his part, is amazed that African-Americans in town accepted their second-class status for so long. "I guess it's like folks who live right by the train tracks," Burris sighs, his chin cupped in his hand. "They get so they don't even hear the whistle blowing at night."

When Burris was young, he tells me, he witnessed two instances of Klan terrorism—one targeted at his own family. "And even though folks here escaped that somehow, that doesn't mean it wasn't being perpetrated just one or two communities over." Far from being "all talk," the Klan, Burris points out, has been implicated in countless murders and other violent acts.

"If I had my druthers," he says, "I'd buy up that Venable property and create a Klan museum, and show folks what the KKK was—and is—really about." It's a noble dream, but

The "6 A.M. Mountain Climbers" hike each morning to Stone Mountain's summit to watch the sunrise. In town, it seems, a new day is also dawning.

what with sidewalks to be poured, drug busts to plan, and real and figurative fences to be mended, it seems this energetic mayor has enough on his plate for the moment.

On my last night in Stone Mountain, I make my way to the Wells Cargo Café, to talk to its owner, Hilda Wells. Hilda came here in 1957 to marry a young man from an old Stone Mountain family. When he died, she thought about going back to her parents' farm. "But once that granite dust gets under your toenails," she says, "you just can't get it out."

At the restaurant's bar, Hilda and Tim Gallups, her husband of 21 years, are curious about what I think of the town, having talked to so many people over the past few days. So, over a glass of wine, I tell them. I tell them that this seems like a nice town, with extraordinarily nice people. I tell them that it is also a town that, like much of the South, has a difficult history. I don't think that most folks here believe what the KKK believes. But I also think that racism can be an easy trap to fall into, and sometimes people are stuck there without realizing it themselves.

Hilda assures me that the folks she knows aren't racist. "People here take care of each other," she says, and I know she means both black and white.

Her attention is drawn to a couple entering the bar. The white-haired gentleman, she tells me, led Wells Cargo patrons in song into the wee hours the previous night.

"He's got one of them robes," Tim whispers to me with a wink as the couple sits down. Raising his voice, Tim calls over, "Don't you have one of those white robes?" The man lifts an eyebrow and laughs, making three K's with his finger above his heart. "Yes, sir," he announces. "I sure do."

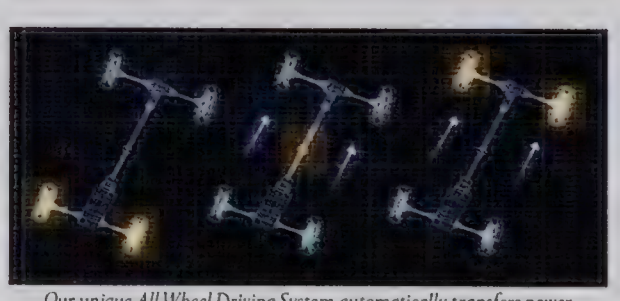
For a moment, I am taken aback, but Hilda puts her hand on my shoulder. "Don't worry," she says. "It was his daddy's."

I find myself thinking about Burris' dream, the one about buying up the old Venable field, when suddenly the otherwise jocular Tim looks deadly serious. With not even a hint of irony, he declares, "You know, that robe really ought to be in a museum somewhere."

"That there," he says, "is history."

Minna Morse is an assistant editor at the magazine. Photographer Maggie Steber contributed, most recently, to an article on trailer parks in the June issue of SMITHSONIAN.

The road ahead is merely a suggestion.



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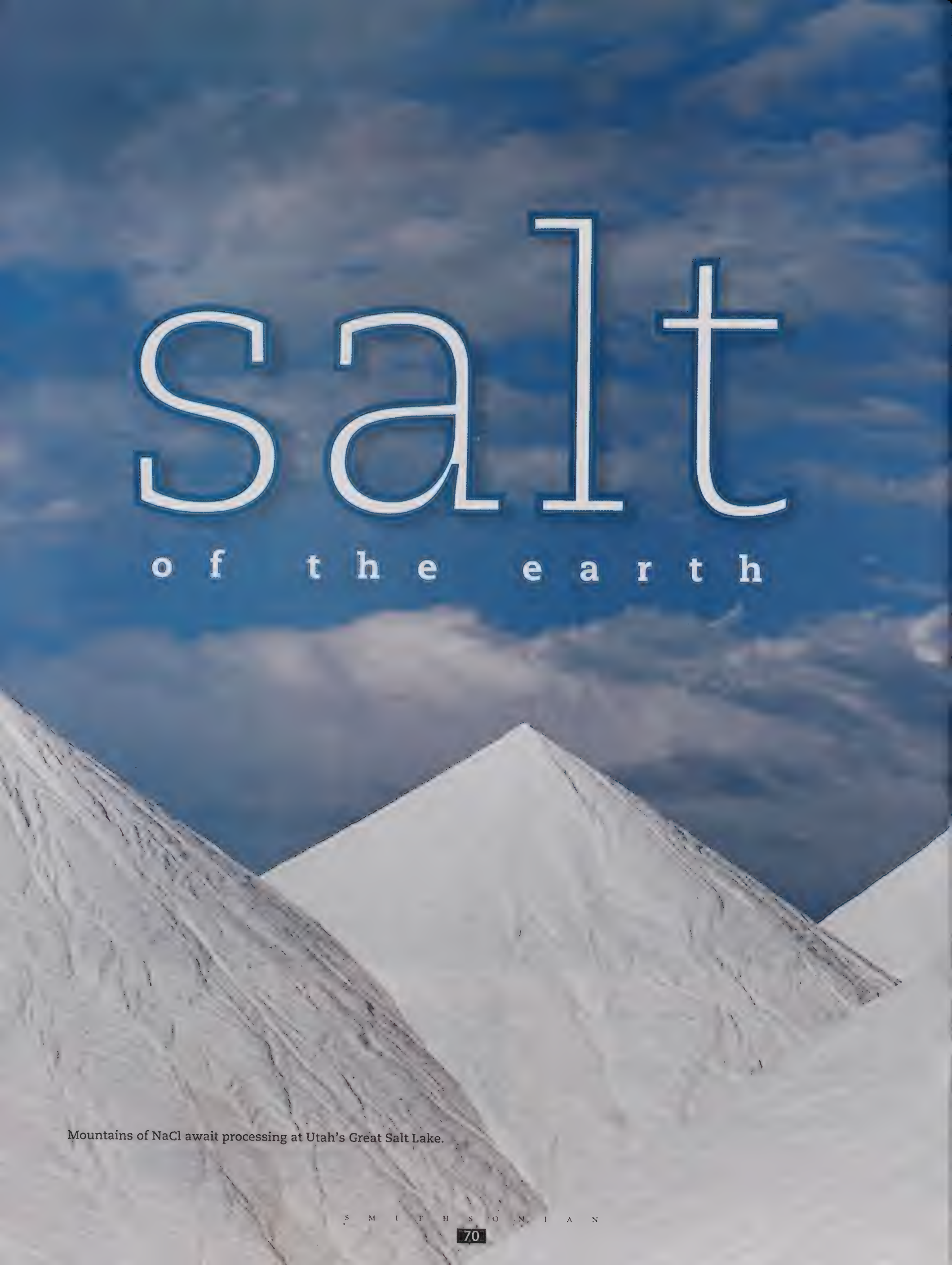


Mountains of NaCl await processing at Utah's Great Salt Lake.

We can't live without it.

Salt runs through our language,

our history and our veins

BY STEVE KEMPER

NOT WORTH HIS SALT. RUB SALT IN A WOUND. TRUE TO HIS salt. Salt an invoice. With a grain of salt. Salty wit, salty personality, salty dog. "Salad," "salsa," "salami"—there's salt at the root of those words. In ancient Rome, soldiers were paid in salt—a *salarium*, or salary.

Salt runs through our language in a thick vein—and no wonder, since it runs the same way through history, religion, folktales, superstitions, geology, physiology and nearly every aspect of daily living, from cosmetics and clothing to gasoline and dinner. For some of us, sprinkling salt on food is as natural as breathing, an instinct that merits no attention whatsoever. And yet salt—sodium chloride (NaCl)—is essential to the health of the planet and every living creature on it.

The human need for salt has shaped history. Civilizations rose in Africa, China, India and the Middle East around rich salt deposits. The appetite for salt pushed Phoenician trade ships into the Mediterranean and camel caravans into the deserts of Africa and across the Euphrates Valley. Salt bought slaves and at times was traded at a value twice that of gold. Marco Polo discovered that Tibetans used salt cakes stamped with the imperial seal of the great Kublai Khan as money.

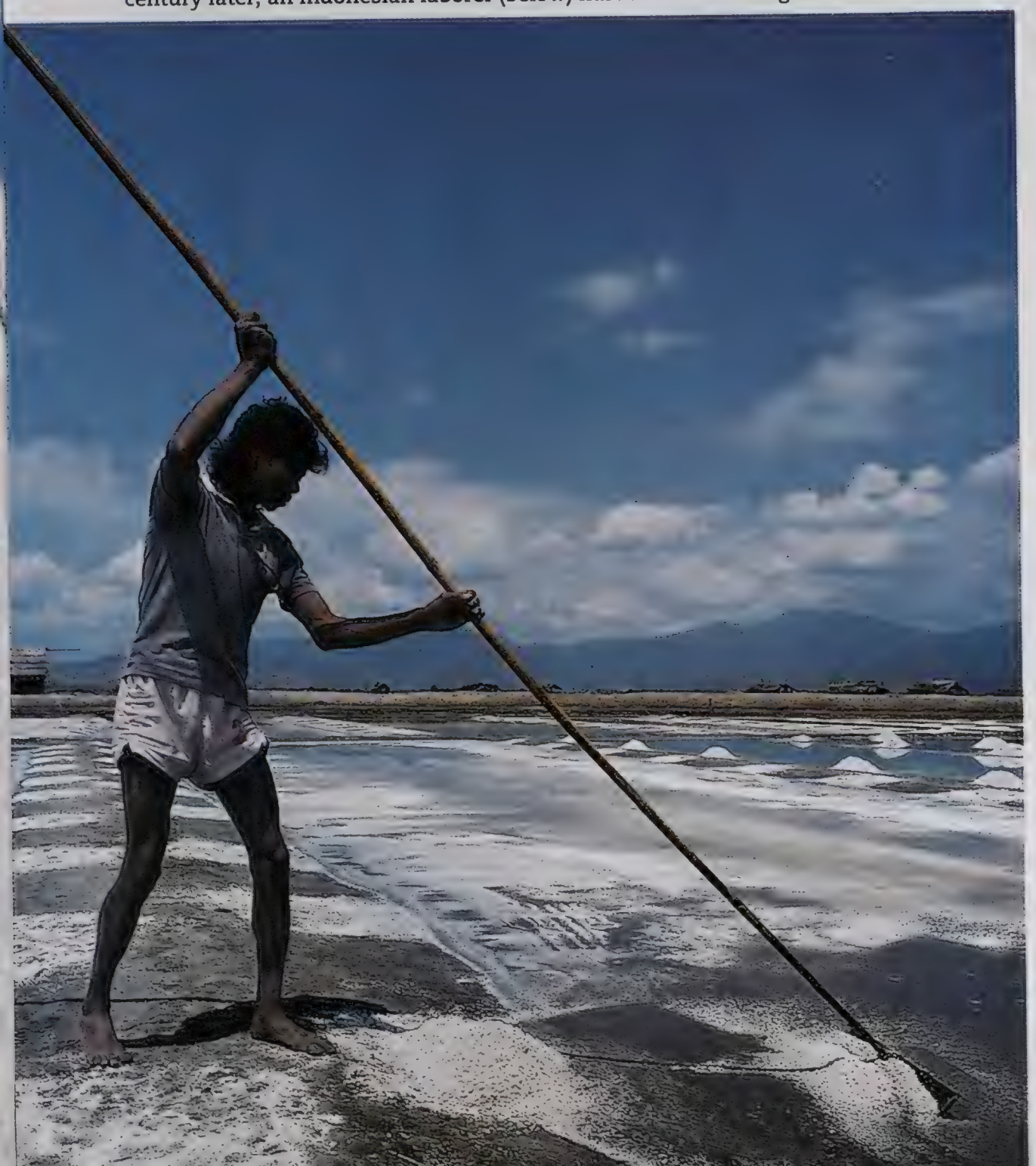
Men have fought over salt with clubs, arrows and cannon. "These German tribes!" wrote the Roman historian Tacitus. "These Chatti and Hermanduri! They fight bloody wars over who shall possess a salt 'stream.'" During the Civil War, Northern generals immediately targeted the South's salt-production facilities, knowing that armies and civilians required salt to maintain health, preserve meat and tan leather. Blood was spilled again and again in battles over the saltworks at Saltville, Virginia, and in the nearby Kanawha Valley. After the Yankees finally captured those places, Jefferson Davis desperately offered immunity from military service to any-

one who would volunteer to tend makeshift salt kettles set up along the coast of Florida and the Carolinas to boil down seawater.

Charles Frazier, in his acclaimed Civil War novel *Cold Mountain*, captured the South's desperation for salt through a character who barters for it: "The most valuable trade, though, was the five-pound sack of salt they had gotten, it having become so scarce and dear that some people now dug up their smokehouse floors and boiled and strained the dirt and then boiled it down and strained it again."

Because everyone, rich and poor, craves salt, rulers going back at least as far as the Chinese emperor Yu in 2200 B.C. have tried mightily to control and tax it. Salt taxes helped finance empires throughout Europe and Asia, but also inspired a lively black market, smuggling rings, riots, even revolutions. In 1785 the earl of Dundonald wrote that every year in England, "ten thousand people are seized for salt smuggling and three hundred men are sent to the gallows for contraband trade in salt and tobacco." A few years later, hogs and cattle began dying in Britain for lack of salt; farmers couldn't afford the exorbitant royal tax. Preacher John Wesley vehemently criticized the levy. Angry mobs stormed across the countryside. Finally, Parliament sensibly abolished the tax.

In the 1890s, American workers (right) filled wheelbarrows with salt for processing. A century later, an Indonesian laborer (below) harvests sun-dried granules with his rake.



Louis XVI should have paid attention. France's long-despised tax on salt helped instigate the French Revolution. The new Assembly quickly ended the tax in 1790, ensuring affordable salt for everyone—a short-lived symbol of democracy and freedom from tyranny. (The salt tax was soon reestablished, not to be abolished again until 1946.) In our own century, Mahatma Gandhi started India on the path to independence in 1930 by undertaking a 200-mile march to the sea to protest Britain's salt tax and its prohibition against gathering one's own sea salt, which Gandhi denounced as intolerable assaults on autonomy and basic human rights.

Long before salt was considered a right, it was a physiological need. Humans have collected and made salt since prehistoric times. Those who lived near oceans gathered saline crust from shore rocks and dry tidal pools.

PP.70.71 CHAD SLATTERY; P.71 GUY CALI ASSOCIATES

P.72 GEORG GERSTER/PHOTO RESEARCHERS; PP.72,73 ONONDAGA COUNTY PARKS, OFFICE OF MUSEUMS & HISTORICAL SITES

With other predators, they hunted the animals drawn to salt springs and licks, and no doubt sought salt at such places themselves. A salty appetite has often been the mother of invention, some of it dubious. The ancient Chinese, for instance, boiled seaweed and evaporated the juice. When Julius Caesar invaded Britain in 55 B.C. he found the natives making salt by pouring brine over hot sticks and scraping off the leftover glaze, a practice that helped confirm them in his mind as barbarians. Caesar always traveled with "salinators" who were skilled at making salt for his troops. Those experts showed the loutish Brits how to boil brine, as the Romans had been doing for centuries.

In fact, salt inspired Rome's first step toward empire, and the first spoke in its renowned system of roads. King Ancus Martius (640-16 B.C.) founded its first colony at Ostia because of the salt marshes there, and the Via Salaria (Salt Road) was built to carry processed salt to the city. As the empire expanded, so did the demand for salt. Rome began importing it from Cyprus, France, North Africa, and even as far away as Palestine and Asia Minor. It was taxed, of course, and officials were appointed to control the trade.

Salt became one of the world's first commodities not only because people hungered for it, but because of its crucial role in religion. Homer called it divine, and Plato described it as a "substance dear to the gods." The Israelites were required to include salt with all offerings; ancient Jewish temples included a salt chamber. For hundreds of years, Roman Catholic priests would place a pinch of salt on a baby's tongue during baptism and say, "Receive the salt of wisdom." The biblical covenant of salt was a solemn bond of lifelong loyalty, permanent and unbreakable.

Salt's association with longevity spans cultures and probably stems from the mineral's preservative powers. Jews and Christians, among others, shared the custom of rubbing newborn infants with salt, a symbol of long life (a treatment echoed in the salt rubs popular at modern spas). Arabs made peace and declared friendship with the phrase "There is salt between us," and considered it treacherous to harm someone with whom they had shared salt. To ensure a long marriage, a Swiss groom would put bread in one pocket and salt in the other, and a German bride would put salt in her shoe. On the other hand, when Lot's wife disobeyed God and looked back at the destruction of Sodom, she petrified into salt. And spilling salt brings bad luck, a superstition immortalized in Leonardo da Vinci's painting *The Last Supper*, where Judas has knocked over the saltcellar.

The basic methods of salt production haven't changed for centuries—boil, evaporate, mine. Yet there have been periods of peculiarity. In 1669, for instance, Dr. William Jackson's influential salt-making manual suggested this recipe: to 20 gallons of boiling brine add, at specific times, two quarts of cow's or sheep's blood, a quart of beaten egg whites and a quarter of a pint of "the best and strongest ale"—this last on the theory that beer helped the salt to granulate.

Humans have collected and made salt since prehistoric times. Those who lived near oceans gathered saline crust from rocks and tidal pools.

Modern salt makers skip the blood and ale (beer in your salt seems to reverse the order of things), but they still boil brine or let the sun evaporate it. At Cargill's solar plant on Great Salt Lake in Grantsville, Utah, plant manager Danny Bauer (who has since left the plant) says, "It takes a whole summer to build a crop you can harvest. It's almost exactly like a farm." The lake is a salt farmer's dream, with a salinity more than four times that of the ocean. Each spring, water from the lake is moved into a series of big concentrator ponds, where sun and wind slowly pull off moisture. Workers channel this saturated brine into crystallizer or "garden" ponds, where more evaporation causes the brine to bond into crystals, which fall to the bottom. Calcium, magnesium and other natural impurities that would embitter the salt get shunted back to the lake.

By September a new crop of salt, 99.2 percent pure, lies four to six inches thick in the ponds. At harvesttime, the ponds are drained, revealing a smooth, dazzling, rock-hard field of white. A specialized harvester slices through the salt in swaths four feet

In the salt mine on Louisiana's Avery Island, a scaling rig scrapes loose fragments from portions of the ceiling that could be dangerous. The mine is more than 1,300 feet deep.

wide. Big dump trucks nuzzle up to the harvester and move with it (p. 79), each receiving 25 tons of salt in about a minute and a half. The trucks empty their loads into a hopper of brine to float off impurities such as tumbleweeds. Screens remove the fine dust particles and other unwanted grit. At this point the salt is 99.7 percent pure. A "wing-stacker" piles it into perfect white mountains, more than 40 feet high and blindingly bright. After draining for weeks, the salt gets conveyed into the plant, where it's dried, screened, crushed and packaged in myriad ways.

Cargill's Utah salt farm produces about half a million tons a year. Eighty percent of it goes for water conditioning, to remove the calcium and magnesium that make most water hard. Just add salt, and dishes sparkle, hair shines, soap suds up better, clothes come out cleaner and more supple, nozzles don't clog, and minerals don't build up in pipes.

Aside from a few specialty customers, such as the Montana pickle maker who requires a super sack of salt weighing 2,250 pounds, farmers claim the rest of the salt crop. Cows, sheep and chickens, like humans, need salt. If they don't get enough of it they lose weight and appetite, and in their craving will eat dirt, rocks and wood, or lick the urine and sweat of other animals. Salt-deprived chickens become runty and nervous, and produce smaller, fewer eggs. By contrast, calves on salt supplements gain weight twice as fast as their unsalted companions. Salt is so popular in the barnyard that farmers use it to "deliver" other important nutrients and minerals, such as iodine, zinc and cobalt.

In parts of East Texas, brine leaches up through the soil from salt deposits, leaving behind a crust. "There are places out there where you can still see holes dug by the first white settlers," says Robert Hardiman, manager of the Morton salt plant in Grand Saline. "They would let the holes fill, then boil off the brine for salt. We're still doing the same things in the same way," he adds, "just with larger and more efficient equipment."

Grand Saline sits on top of a salt "dome"—an underground mountain of nearly pure salt squeezed together by geologic pressure. (Salt also occurs in extensive beds, the remnants of old oceans, especially in New York, Oklahoma, New Mexico and Kansas.) Domes dot parts of Texas and Louisiana like measles. Their shapes vary—cones, mushrooms, baseball bats, squiggly worms. "This one," says Hardiman, "is not unlike a can of salt, a cylindrical column with straight sides." It's 1 1/2 miles in diameter and about 3 miles deep. "We have enough salt here to last the whole country thousands of years."

The evaporation method of producing salt is simple: sink two pipes, one inside the other, into the dome. The center pipe carries water down for dissolving the salt, the outer pipe carries the brine back to the surface. The brine then passes through a series of steam evaporators that boil

GUY CALI ASSOCIATES

the liquid off until the salt crystallizes and settles to the bottom. After that comes drying and packaging.

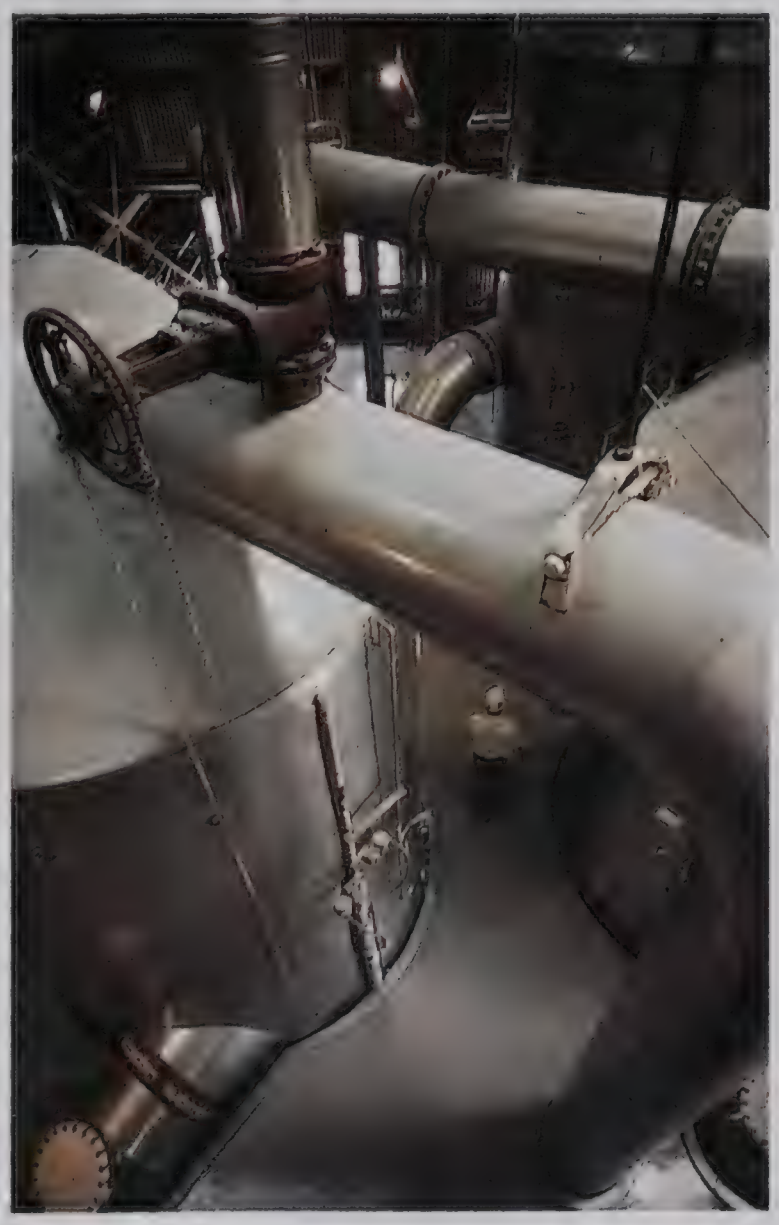
Unlike solar salt, or rock salt from mines, evaporated salt isn't exposed to human hands or the elements, and is virtually pure—99.5 percent or better. For that reason, most food salt—which, surprisingly, accounts for only 4 percent of salt production—comes from evaporation plants. Morton ships about 150,000 tons of it from this plant per year. Some ends up in the familiar blue Morton cans. Some goes on peanuts or in cheese. Farm animals lick up a portion. A few pinches get sealed into single-serving packets destined for fast-food restaurants. Film companies buy some for delicate emulsions that require chemical purity. The clothing industry takes a big scoop—brine drives dye into fabric. Altogether, some 400 different kinds of salt products crowd the Morton warehouse.

The third method of modern salt production is mining. The oldest salt mine in the country operates on Avery Island, in southwestern Louisiana. The island is actually a salt dome that rises 150 feet above the surrounding bayous and cypress swamp. Several such islands push up from the Louisiana low country. Natives were extracting salt from a brine spring on Avery Island around A.D. 1000. During the Civil War, workers deepened the spring in hopes of easing the South's salt famine, and discovered a solid white mountain 16 feet below the surface. But their joy was short-lived. The Northern Army captured and flooded the mine a year later.

In 1898 a new mine was dug. A steam hoist dropped miners 500 feet to chip and shovel salt. They loaded it onto mules that never left the mine and eventually went blind from the darkness. Visitors today can still be lowered into the mine by that same massive hoist, but nearly everything else has changed.

The working mine now begins at 1,300 feet and continues to 1,540—still far short of the dome's depth of 40,000 feet. About 2 1/2 million tons of rock salt (called halite) gets carved out of Avery every year. The mine now produces in one day what once took an entire year. More than three-quarters of Avery's salt goes up the Mississippi by barge, destined for icy Northern roads. The chemical industry takes the rest to make such things as sodium hypochlorite (for disinfectants and bleaching agents, long-playing records and PVC piping); sodium chlorate (for herbicides, defoliants, matches and fireworks); and hydrochloric acid (for the cleaning of gas and oil wells). Shrimpers take a bit, too—fish float in brine because of their body cavity, but shrimp don't, making it easy to separate the netted catch. Tabasco pepper sauce made on Avery Island (SMITHSONIAN, May 1984) is cured and seasoned with salt from right here.

Grand Saline sits on top of a salt "dome"—an underground mountain of nearly pure salt squeezed by geologic pressure.



Inside the gleaming evaporator at Morton's salt plant in Grand Saline, Texas, brine from a well is boiling.

The mine is a hive of colossal salt rooms and pillars, each 200 feet square, with walls soaring to 100 feet. Though the dome is 99.8 percent pure salt, the walls are sooty from the fumes of jeeps, forklifts, dump trucks and loaders that rumble along the subterranean salt roads. Such equipment is too large to enter the mine, so they are taken apart first and reassembled below. Like the mules, they never resurface, and there are alcoves filled with rusty abandoned machinery from every era.

The mining proceeds in two ways. The first involves undercutting a section of wall 100 feet long by 20 feet deep, planting explosives and detonating them at night when the mine is empty. Trucks haul the salt rubble to crushers and conveyors. "Sometimes when I was a kid," recalls

PETER POULIDES

CHAD SLATTERY (2)

A bulldozer-drawn harvesting machine cuts a four-foot swath in one of the crystallizer ponds and dumps salt into an accompanying truck.

Nancy Hotchkiss, a member of the Avery family who spent many of her childhood summers on the island, "we would be eating dinner and feel the blast and see the milk shake in our glass."

The second and newer method involves the use of a massive machine called a continuous miner; each of its two Caterpillar tracks weighs 16 tons. Two rotating spiked balls chew through the salt, carving a tunnel each day that's 22 feet wide, 27 feet high and 40 feet long. The awesome equipment fills the air with dust that's salty to the tongue.

"You do get awful thirsty down here," remarks Ben Kochenower, an engineer technician, looking at the particulates dancing in the beam of his flashlight. "But it also clears up my sinuses when I have a cold." He aims his light at the ceiling, where a painted red circle surrounds a plug. "We call that a guardian angel," he says. "It's a sensor. If the roof moves at all, a rod with reflective tape pops out."

Though salt mining is safer and cleaner than most underground industries, it's subject to some of the same dangers—fractures, collapses, pockets of deadly gas. Because gas and oil sometimes occur close to salt deposits, petroleum companies often drill nearby. In 1980 a Texaco drill punctured the roof of a salt mine beneath Lake Peigneur, Louisiana, draining the lake and flooding the mine. A methane gas fire killed five workers in the mine at Belle Isle, Louisiana, in the 1970s. In 1994 geological abnormalities evidently caused a collapse in New York's Retsof mine, one of the world's largest room-and-pillar mines, fracturing aquifers that flooded and ruined the mine.

Sun and wind evaporate the moisture from crystallizer ponds in Utah, producing salt.

And yet salt deposits far removed from water tables and oil wells are considered among the most stable geologic formations. "That's how we sell it," says Lee Spence, president of Underground Vaults and Storage in Hutchinson, Kansas. Spence's 40-year-old company has turned part of a working mine into a gigantic 26-acre warehouse where clients keep important records, film, collectibles and other precious materials; one client stores a Stradivarius there. "In a salt mine, you're covered from any type of disaster, flood, hurricane, fire," says Spence.

A few years ago, part of Morton's mine in Weeks Island, Louisiana, was commandeered by the federal government to hold the country's strategic petroleum reserve—73 million barrels. After it started to leak, most of the oil was removed. Now Uncle Sam is finalizing plans to open the United States' first underground nuclear waste site in caverns carved from salt deposits in New Mexico (SMITHSONIAN, May 1995). The Energy Department chose the site because the formation has been stable for 250 million years, and because salt's plasticity should seal any cracks, but skeptics are fighting the operation.

A different kind of controversy concerns the physical effects of the salt we put into our bodies. Each of us contains about four ounces of the stuff. Unless we get enough of it, our muscles won't contract, our blood won't circulate, our food won't digest and our hearts won't beat. But how much is too much?

The argument over this question seems to be heating up. For years, many researchers have claimed that salt threatens public health, mostly by contributing to high blood pressure, or hypertension, a cause of stroke and heart disease. If you want to live longer, they warn, you'd better eat less salt. Many food products now advertise themselves as "low-salt" or "no-sodium," and stores are packed with books that condemn demon salt and preach the gospel of low-salt living.

Recently, though, other research-

Seattle artist Pam Gazale displays a collection of utilitarian objects she carved from salt blocks intended for farm animals: a turban, two apothecary bottles, a book and a bowl.

ers have begun to rehabilitate salt's reputation. Last year, for instance, an analysis of salt studies done over the past two decades concluded that there's no reason for doctors to recommend reducing sodium intake for people with normal blood pressure. It may be that most of us are protected from excessive salt by our kidneys, which regulate the body's sodium level and eliminate any excess. In fact, doctors at Johns Hopkins Children's Center in Baltimore have found a link between very low blood pressure and the debilitating condition called chronic fatigue syndrome. The treatment includes salt supplements and plenty of liquids, plus lots of pickles, olives and other salty foods.

Salt cures aren't new. In the early 19th century, sick people traveled to rudimentary spas such as French Lick Springs in Indiana and Big Bone Lick, Kentucky, to soak in salt springs. Today's much more luxurious spas offer salt baths, glows, rubs and polishes to remove dead skin, stimulate circulation and relieve stress.

In this century, the simple addition of iodine to food salt wiped out iodine deficiency disorders (primarily goiters) in the industrialized world, though the problem remains serious in less developed nations. People with psoriasis have noticed that bathing in the salty Dead Sea reduces or even clears up their lesions, a treatment now mimicked in "balneophototherapy"—a salt bath followed by time under an ultraviolet light. It's possible, however, to overestimate the curative powers of salt. In the 1890s, a popular cookbook and first-aid guide included this tip: "To Restore From Stroke of Lightning: Shower with cold water for two hours; if the patient does not show signs of life, put salt in the water, and continue to shower an hour longer."

Salt makers like to say that their product has 14,000 uses. Pam Gazale has found the 14,001st. The Seattle artist carves lovely sculptures from colorful salt blocks—pink, red, yellow, white, cobalt blue—intended for farm animals. In 1991 she saw a TV program about the Tuareg salt caravans in the Sahara. Beginning about A.D. 1000, Timbuktu, established by the Taureg nomads on a branch of the Niger River, became a major trading center where for centuries salt was bartered for gold. Gazale says she was inspired by the way the salt was hewn right out of the earth. She liked the idea of carving ordinary, utilitarian objects—a spoon, a bottle, a bowl—out of a mineral so fundamental to human life and history. At the moment she is sculpting various objects usually made of cloth, combining sculpture's tradition of drapery with salt's importance to the textile industry. "It carves similarly to stone," she says. "It really looks like Carrara marble when I'm done. It has a presence like no other material I've used. And I like the fact that it's a pure element and so essential."

It's a long journey from ancient Britons scraping saline crusts to Gazale shaping salt sculptures. Yet our appetite for salt and the meanings we attach to it have linked the ages. Salt literally gives us life, and reminds us of the origins of all life in the primordial sea. It has motivated the pious, the warlike, the superstitious and the revolutionary. It has inspired storytellers, artists and cooks. William Blake found infinity in a grain of sand, but Chilean poet Pablo Neruda probably comes closer to the truth in his *Ode to Salt*:

> the smallest,
> miniature
> wave from the saltcellar
> reveals to us
> more than domestic whiteness;
> in it, we taste infinitude.

Frequent contributor Steve Kemper likes to sprinkle salt on watermelon and grapefruit.

CHAD SLATTERY

Most men will have an isolated erection problem at some time in their lives, but for others it happens more frequently. If the inability to respond naturally to your partner has become a recurring problem, you may be suffering from a treatable medical condition called erectile dysfunction (ED), also known as impotence. The following questions and answers are designed to give you a brief introduction to the causes of ED and the various treatment options available. If you believe you are suffering from ED, or want to know more about the condition, talk to your doctor or other healthcare professional.

Erectile dysfunction: what every man should know

What is ED?

Erectile dysfunction is the consistent inability to achieve and/or maintain an erection sufficient for satisfactory sexual activity. That means not just an occasional problem, but one that has been occurring repeatedly for a period of time. It's a widespread condition, shared by approximately 30 million men in the United States.

What causes ED?

It was once believed that ED is all in your head, or just an inevitable result of getting older. Actually, the majority of ED cases are associated with physical conditions or events, including some that are age-related. The most common risk factors for ED include:

- *Diabetes, high blood pressure, hardening of the arteries, or high cholesterol*
- *Injury or illness, such as spinal cord injury, multiple sclerosis, depression, stroke, or surgery for the prostate or colon*
- *Medications that may bring about ED as an unwanted side effect*
- *Cigarette smoking or alcohol/drug abuse*
- *Psychological conditions, such as anxiety and stress*

If you want to know more about ED, talk to your doctor.

Can erectile dysfunction be treated?

Yes. The good news is that, regardless of the cause, the vast majority of ED cases are treatable. Patients have a variety of treatment options from which to choose, including oral medication, hand-held vacuum pumps, self-administered injections, pellet suppositories, and surgical implants.

Can anyone use these treatments?

It's important to remember that these treatments are not for everyone, but only for men diagnosed with ED. You and your doctor can determine the appropriate treatment for you. Because sexual activity can be demanding on the heart, you should talk to your doctor before using any treatment for ED.

How do I know if I have ED?

If you have erection problems, you probably already know it. But before your condition can be treated, you need to be diagnosed by your doctor. There is no need to be embarrassed or ashamed when discussing ED with your doctor. He or she has probably diagnosed and treated ED many times. Your doctor can provide you with understanding, support, and best of all, information.

To diagnose ED, doctors typically ask a few specific questions and give a routine physical exam. This should help your doctor arrive at a diagnosis. Before starting any treatment for ED, ask your doctor if your heart is healthy enough to handle the extra strain of having sex.

Based on this information, you and your doctor will decide on the treatment that is best for you.

REMEMBER:

ED is a common medical condition.

It's not an inevitable result of growing older.

ED is treatable with a variety of methods.

Only your doctor can prescribe the appropriate treatment.

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AFTER FOUR CENTURIES

DOSSO

A RENAISSANCE ARTIST

DOSSI

IS BROUGHT TO LIGHT

THE FIRST LARGE-SCALE INTERNATIONAL loan exhibition to be shown at the new J. Paul Getty Museum, resplendent atop a hill in Los Angeles, is of a little-known Italian Renaissance artist who, in the more than 400 years since his death, has never before been given a one-man show. It is, as this intriguing exhibition reveals, long overdue.

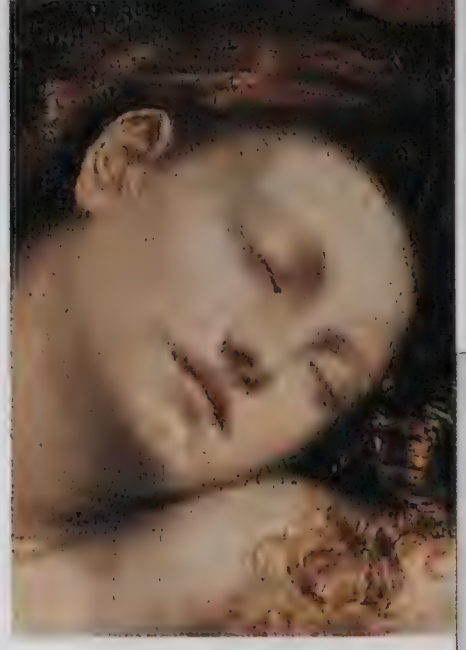
It is a remarkable and imaginative choice—a deeply satisfying collaborative venture by the Getty, New York's Metropolitan Museum of Art and a cluster of Italy's regional cultural authorities. Here then is Dosso Dossi.

Dosso who?

It is not a name anyone would drop at an arts event. The references to him in books on the period are slight. And yet, as it happens

Right: Dosso's relief-like *Allegory of Fortune* (c. 1535-38) depicts the commanding figures of Fortune, bearing a cornucopia, and Chance, brandishing lottery tickets. Inset, top: *Anger* (c. 1515-16) is one of seven allegorical works with genre figures painted for the ceiling of Duke Alfonso's bedroom.

BY BENNETT SCHIFF



In the enigmatic *Allegory with Pan* (right), dubbed "The Sleeping Beauty" by the Getty, a luminous nude lies on a bed of flowers, as Pan—the only clearly identifiable figure in the composition—and two female figures hover over her. The detail (above) reveals Dosso's skillful rendering of the nude's dreamy state. The cupids (detail, below) indicate that the subject of the painting is love, but the artist's full intent remains elusive.

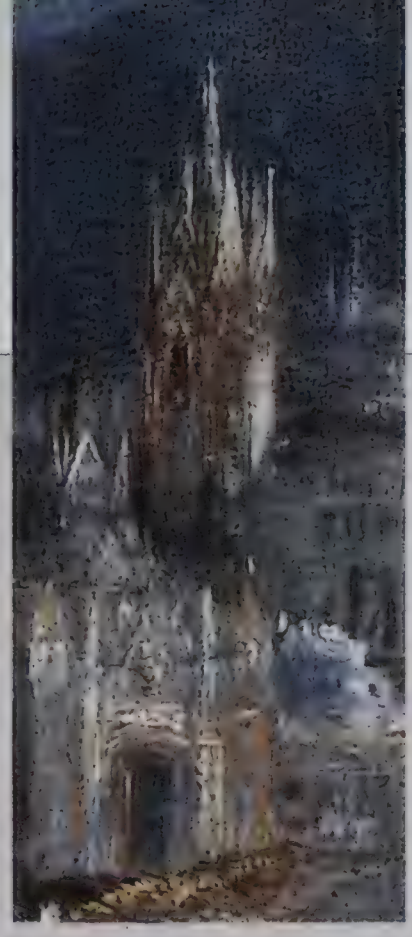
from time to time, fine and even great artists can be overlooked for a century or two. Witness the case of Vermeer, who died in 1675 and dropped out of sight for more than 200 years.

Dosso Dossi died in 1542 and by about the middle of the 19th century had descended into obscurity. The Getty acquired its first Dosso, a mythological scene (right), from the marquess of Northampton in 1983. Titled *Allegory with Pan* in the show's catalogue, it became known among the staff at the Getty as "The Sleeping Beauty," an admiring salute to its sumptuous nude. As is more usual than not with Dosso's work, no one knew what its actual title was or when it was painted. Except for one signature of a sort at the bottom of his *Saint Jerome,* intended as a visual puzzle, he never signed a work. Nor did he date any—a situation that has confounded authorities to this day, although continuing study has led to some logical revisions of previous estimates. But it is not only the subject matter, the titles and the dates of Dosso's paintings that are elusive. Like that of many other Renaissance artists, the physical history of much of his work, how it got where it is now, is just as mysterious.

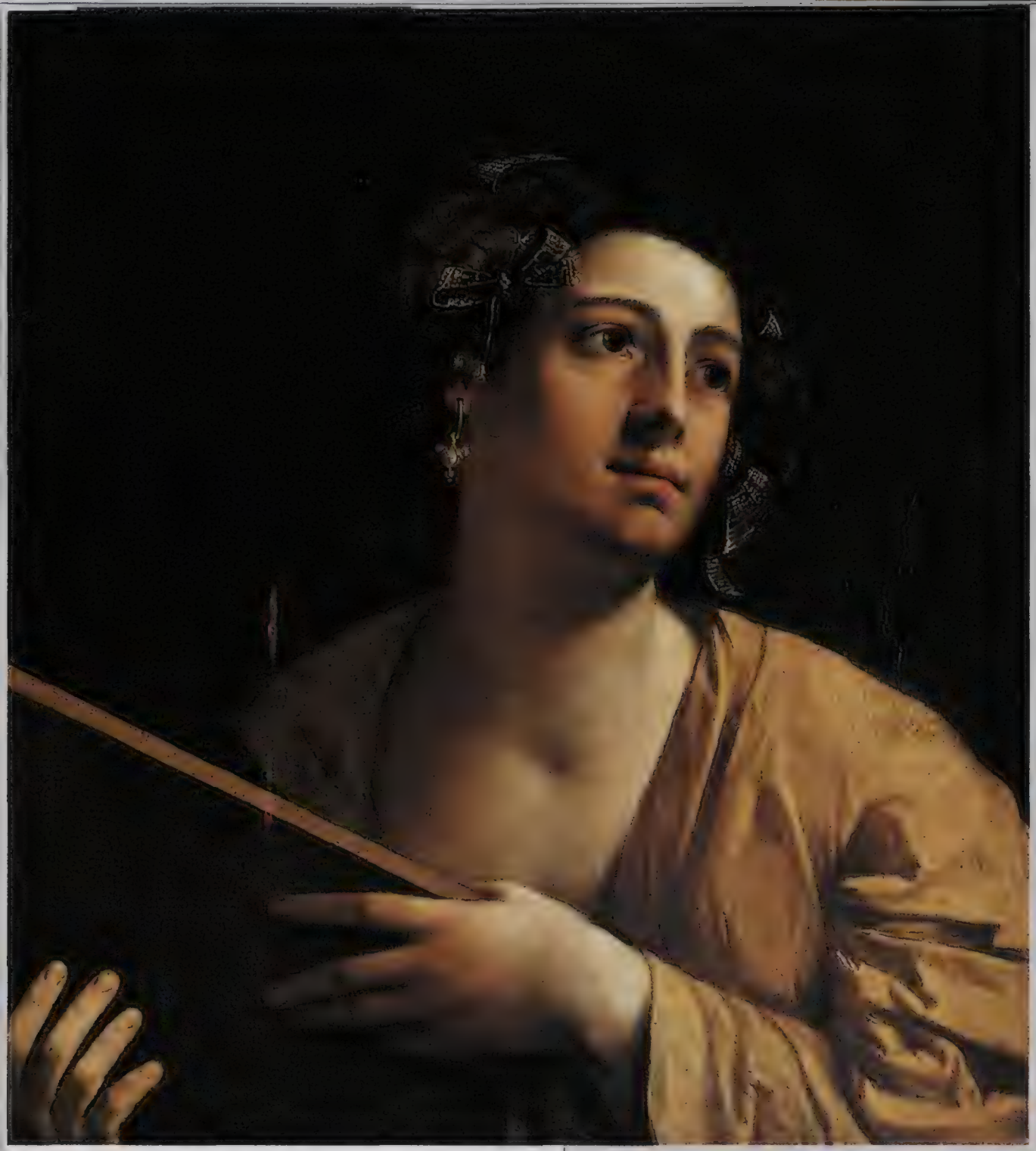
And so, in 1989, to the considerable delight of scholars and collectors, something happened that could in fact happen again. Another Dosso, a spectacular tour de force, turned up in a warehouse in a small town in upstate New York. Called *Allegory of Fortune,* it was quickly snapped up by the Getty.

To scholars the acquisition of a Renaissance painting of high quality and originality is a delicious event, a feast for research, examination and explication, a fairy tale that in the world of art comes true only now and then.

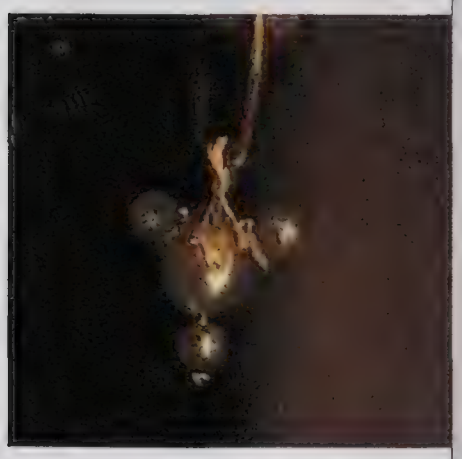
"It appeared out of the blue," says Dawson Carr, associate curator of paintings at the Getty and one of the show's curators. "We already had our 'Sleeping Beauty,' and we jumped at the chance to



Dosso reworked this canvas, one of his most sensuously beautiful, several times, painting over the woman in the red cloak (she was later revealed during a 19th-century restoration) and then adding the more loosely rendered, less-defined figure of Pan. The fairy-tale landscape in the background features a shimmering Gothic city (detail, above). In his day, Dosso was known as the greatest landscape painter in Italy.



Dosso's sensitive portrait of a sibyl, or prophetess, reflects his interest in representing human attributes, in this case clairvoyance. The care that he lavished on delineating the opulence of such elements as ribbons, gold and jewelry is evident in the detail below.



historical context in which Dosso lived. Two seminars, one at the Getty and the other in Trent, Italy, were held. The result was a revitalization of Dosso scholarship and a series of intensely researched papers. A selection of these papers has been handsomely published by the Getty as *Dosso's Fate: Painting and Court Culture in Renaissance Italy*.

But Dosso is not only of interest to art historians, conservators and other specialists involved in the intricacies of Renaissance art and life. He is also an immensely entertaining, engaging and poetical artist who has a great deal to offer people who simply like to look at pictures. Look at Dosso's work long enough and it begins to cast a spell.

For some time there have been conflicting opinions regarding Dosso's date of birth. It has now, more or less, been narrowed to 1486 or 1487. His father, Niccolò Luteri, came from Trent and served as the bursar at the court of Ercole I d'Este in Ferrara. The artist had a brother, Battista, also a painter, with whom he frequently took on joint assignments. For some time his work was attributed to his brother and vice versa, but the differences now are evident. A small section of the show that is devoted to Battista reveals this clearly. Dosso was married and had three daughters, the youngest of whom was only about 10 when he died. We don't know what he looked like because he never, so far as is known, painted a self-portrait. Nor is there a documented portrait of him by someone else.

He was born Giovanni Francesco Luteri, not far from the small property called Dosso that was owned by his family. As frequently happened with Italian painters of that time, his birthplace has transmuted into his name. His younger brother was known as Battista del Dosso or Battista Dossi, and historians wrongly

get another Dosso. The idea of a Dosso show emerged gradually. We realized we had two of his best works and the public liked the pictures. We needed a good partner, though, and so we went to the Met." Together, the two museums applied to the Italian authorities, the superintendents of the arts of Ferrara, Modena and Bologna, and were enthusiastically received. It was an ambitious undertaking.

The exhibition opened in Ferrara late last September in the Palazzo dei Diamanti, a perfectly preserved 15th-century palace that once was the home of the princely Este family of Ferrara. The show moves to the Metropolitan on January 14 and closes there March 28. It then travels to the Getty, where it will be on view from April 27 through July 11.

From the moment the exhibition was planned, the Getty decided to launch a scholarly project that would look into the social, intellectual and

P. 80 FONDAZIONE GINI, VENICE; PP. 80-83 J. PAUL GETTY MUSEUM, LOS ANGELES

concluded that the brothers' family name was Dossi. Thus, "Dosso Dossi" emerged and became part of history.

Much is known about the court life of the Este dukes of Ferrara, Alfonso I and his son Ercole II, for whom Dosso spent some 30 years of his life working. The painter first appeared in Ferrara in July 1513. He was in his mid-20s, a fully professional artist, although it is not at all certain with whom he studied. The only documented record of his work before that time dates from the previous year when, as Peter Humfrey, professor of art history at the University of St. Andrews, Scotland, writes in an illuminating essay in the show's comprehensive catalogue, Dosso received payment for "a large picture with eleven figures" for the palace of San Sebastiano in Mantua. This was the favorite residence of Alfonso I d'Este's brother-in-law, Francesco II Gonzaga, marquess of Mantua, the husband of Alfonso's sister Isabella, who was renowned for her interest in poetry, music and the fine arts.

In any event, Dosso's work was apparently pleasing to all who saw it, and so in 1514 he took up residence in the palace complex of Duke Alfonso and went to work as a court painter, a job which entailed a good deal more than painting pictures.

Alfonso, writes Andrea Bayer, the Met's curatorial representative in the joint effort, seemed to be very fond of Dosso. Vasari says in his *Lives of the Painters* that Dosso "was much loved by Alfonso . . . first for the qualities that he brought to the art of painting, and then because he was an affable and pleasant man, and such men gave pleasure to the duke." Dosso almost certainly traveled with the duke to Rome, which was no small distinction in those days. When Alfonso died in 1534, his son Ercole II continued Dosso's employment.

A court painter had to be a facile switch-hitter in a number of disciplines, frequently keeping multiple assignments going at the same time. The ducal palaces were immense structures; the main complex included a moated 14th-century fortress containing halls the size of football fields that rose 50 feet to their richly decorated, coffered ceilings, dazzling in the intricacy of their carvings and ablaze with color. These monumental spaces had to be embellished, inch by inch, with frescoes. The private apartments of the ducal family and retainers were also marvels of refined decoration and carving. It is no small measure of the respect in which Dosso was held that one of his works hung in the duke's private apartment alongside paintings by Giovanni Bellini and Titian. Since the 15th century, the Este of Ferrara

The Giorgionesque style and delicacy of handling of the arresting and amusing *Buffoon* (c. 1510) point to its being one of Dosso's earliest surviving works. The canvas was very thinly painted, which accounts in part for its current badly damaged condition.

GALLERIA ESTENSE, MODENA (2); P. 84 STATE HERMITAGE MUSEUM, ST. PETERSBURG (2)

A luxuriant, untamed landscape dominates the composition of *The Three Ages of Man*. The three sets of genre figures reference the passage of time, but seem almost incidental. The pair of men in the background (detail, above) represent old age.

had employed such artistic eminences as Rogier van der Weyden, Piero della Francesca, Jacopo Bellini and Pisanello to produce the allegorical, mythological, secular and devotional paintings they required.

Ferrara at the time was renowned for the splendor of its court life. When Dosso and his assistants weren't painting huge wall frescoes or turning out individual canvases, they were designing theater sets and tapestries, as well as banners for tournament trumpets and flags for the duke's ships. They gilded the palace's elaborate woodwork and even undertook the richly decorative painting of the ducal coaches.

The poet Ludovico Ariosto, acclaimed author of *Orlando Furioso*, was a resident of the city. His work was produced for the ducal theater with scenery designed and painted by Dosso and his helpers.

The brilliance of the Este court rivaled that of Rome, and from Rome in 1501 came Lucrezia Borgia, daughter of Pope Alexander VI, to marry Alfonso, then a widower. At 21, the beauteous, golden-haired Lucrezia had already disposed of two husbands (one of them allegedly murdered by her notorious brother Cesare). As it turned out, Lucrezia became in time a model duchess and a cultivated patroness of music and art.

In 1597, Lucrezia's grandson Alfonso II died, and being without children and thus leaving no lineal male Este descendant for the first time since the 13th century, made it possible for Pope Clement VIII to march in, take over the rich prize of Ferrara, which Rome had long coveted, and append it as a papal state. Thus began the eventual diaspora of Dosso's work. In the course of the 17th century, one scholar points out in *Dosso's Fate*, "virtually every major Roman family claimed to own one or two paintings by Dosso."

The exhibition in the United States has some 50 works of the 100 or so that are believed to exist today in museums and private collections in Europe, the United States and Russia. "It is a sobering thought," writes Peter Humfrey, "that, with the conspicuous exception of the monumental Costabili polyptych [a massive altarpiece executed c. 1513 by Dosso and his older colleague Garafalo for the Church of Sant' Andrea in Ferrara] virtually nothing by Dosso remains today in the city where he lived and worked for three decades."

There are, however, two little panel paintings in the show—a *Nativity* and an *Adoration of the Magi*—each about 15 by 21 inches, that are in the permanent collection of Ferrara's municipal art museum. These are devotional works, glorious in the depth of their color, notable for their encompassing mood of pious warmth, and remarkable for their lack of the cloying sentimentality so common in the painting of that time. These are early

METROPOLITAN MUSEUM OF ART, NEW YORK (2)

works, and the influence of the Venetian master Giorgione is clear.

Yet even in these early works, one can discern elements of Dosso's style that appear time and again in his later paintings: tiny romantic, evanescent landscapes added to the upper right or left quadrants of his pictures; individual personalities given to the animals present; minute attention to plants, stones and blades of grass.

Dosso's color is intense and vibrant, almost as if it were mixed with light itself—glowing dusky reds, blues out of the heavens, vivid oranges, and a penetrating green. The orange in particular, which contains a sulfide of arsenic called orpiment, could be dangerous to work with, and Dosso was as liberal with it as was Titian. Dosso got his paints from nearby Venice, where the best color merchants in Europe practiced their trade.

He apparently also studied in Venice—where he was influenced deeply by Giorgione—at a time when oil-based paint was replacing tempera, and canvas was taking over from wood panels as a surface on which to work. These were revolutionary changes, permitting entirely new methods of expression—plasticity and texture, and the magical color for which the Venetian painters, particularly Titian, became noted.

It was Giorgione, explain Carr and Andrea Rothe, chief conservator of the Getty, in the show's catalogue, who reversed the customary method of applying paint in transparent, increasingly darker layers, working up from a light ground. Instead, he began with a dark ground and worked toward lighter values. "By combining the use of opaque paint with glazes, Giorgione achieved an extraordinary tonal range," they write.

Dosso adopted this technique, along with Giorgione's method of feathering the edges of his forms, blending figures and objects into the surrounding air to achieve a more natural appearance, more consistent with what the human eye sees. He shaded precise outlines to make hazy transitions between objects and volumes of color. At the same time, in the midst of a canvas loosely brushed in a poetically casual way (an attitude toward painting that was especially characteristic of him) there is the most precise examination and portrayal of small details—fabrics, flowers, eyelashes, eyebrows, fingernails, feet. Following Giorgione's lead, he was also one of the first painters to work out compositions immediately on the canvas, creating form directly out of color and varying the consistency and application of the paint for expressive purposes. "This is the moment," maintain Carr and Rothe, "when brushwork truly became a vehicle for creative expression."

In later years, under the influence of Raphael, whom he knew, and of Michelangelo, whose work he likely saw in Rome and Florence, Dosso was to change his style, defining out-

Dosso's masterful *Melissa* (c. 1515-16) owes its richness of color and texture, its grandeur of form and its lush landscape to the artist's study of Venetian painters. The strong element of fantasy and the minute rendering of such details as the damask drapery's fringe (below) are Dosso's own.

GALLERIA BORGHESE, ROME (2)

Done relatively late in Dosso's career, *Holy Family* (c. 1528-29)—an unusually domestic treatment of the subject—is characterized by dramatic highlighted areas emerging from dark shadows, by the monumental conception and complex poses of its central figures, and by its classic pyramidal composition.

lines of objects and figures more clearly, smoothing out forms.

On a Sunday afternoon the citizens of Ferrara have come, as they have come every day since the exhibition opened, to see the work of a favorite son. They have dressed for the occasion. There are no jogging suits, no sneakers. This is a small, quiet city of roughly 150,000. Whole families are here. It is an easy atmosphere, but there is still something formal about it. Visitors appear engrossed and emanate a feeling of engaged pride. They are paying their respects to one of their own, an affirmation of their history. And, not least of all, they are having a good time.

For here are gathered more Dossos in the city that gave them birth than there have been in 400 years, ever since the pope's forces incorporated Ferrara into the papal fold. The exhibition coincidentally marks the anniversary of the takeover and the dissolution of the ducal holdings. To have Dosso's paintings together once again is a remarkable feat.

The pictures have been hung, so far as the experts could determine, in chronological order. The exhibition begins with Dosso's *Nymph* and *Satyr*, which is thought to be his earliest known work. This close-up double portrait shows the direct influence of Giorgione in technique and composition but is Dosso's own in expression.

Another early work, likely done before Dosso became part of the ducal court, is titled *Buffoon*. It pictures a clown or joker in a dreamlike setting. A happy grin on his face, he cradles a sheep, which is painted with Dosso's usual tenderness toward animals.

One of the show's most commanding, richly painted works is thought to depict Melissa, the good enchantress of Ariosto's *Orlando Furioso* who delights in changing bewitched animals back into men again. This is a magnum opus, a display of Dosso's considerable skills in color, drama and landscape as well as his virtuoso handling of the brush. At Melissa's side is a beautifully observed, ghostly gray dog that appears almost on the verge of being morphed back into a man again.

The Getty's *Allegory of Fortune* is another masterpiece. Painted in Dosso's later style, it reflects the more ordered classicism of Michelangelo. It is a large, dramatically grand work showing two heroic nudes, a male and a female, highlighted against a spaceless, dark background. As the goddess of good fortune, the female figure holds a cornucopia. But she sits precariously on a dangerously bending bubble, a typical Dossesque conceit, which brings forward the artist's sleight of hand and quick mind. The male figure grasps a sheaf of lottery tickets. The golds, yellows and reds, and the sensitively observed skin tones of the nudes make this one of Dosso's most striking images.

Each of the paintings in the show casts its spell, and it is no easy decision to exit the Palazzo dei Diamanti and emerge into present-day Ferrara.

Located in the heart of the Po River Valley in Northern Italy, the engaging city is a natural venue for bicycles. Fleets of cyclists sail by on their way to work or to shop. There are remarkably few motorbikes and not that much traffic. Taxi drivers smile, thank you, and speed away without waiting for a tip. People in the shops smile. In all, it is a place very like the idyllic, shimmering landscapes Dosso puts in so many of his canvases—extra little gifts to his viewers.

The exhibition is not, in the sense that has become customary, a blockbuster. In some ways it is better. It introduces a superb, enigmatic artist of great power, individuality, magnetism and eccentricity and it sets him solidly into the life of his age, the courtly life of the High Renaissance. It enhances our view of human society at a time of creative achievement, and it entertains and delights.

Think of Ferrara in 1529 at the height of Dosso's residence there. It is carnival time and Ercole II is giving a banquet for 104 guests in the great hall, which is truly great—a huge, lofty space, decorated over every inch in gilt, scarlet and vibrant blue. First there is a performance of Ariosto's *La Cassaria*. Each course of the meal is accompanied by different musical offerings: singers, harpsichordists, violists, flutists, trombonists, violinists, recorder and wind players. Four trumpeters sound the end of the feasting with ringing fanfares. Later there is dancing until dawn. And Dosso, you like to think, gets up from the table and, skipping sleep, heads for his studio to paint the picture you are looking at right now, 470 years later, and that others will look at for centuries to come.

Contributing editor Bennett Schiff wrote last on sculptor Aristide Maillol in June 1997.

ROYAL COLLECTION, HER MAJESTY QUEEN ELIZABETH II, HAMPTON COURT (3)

The distant castle landscape (detail, below) is illuminated by a supernatural light that emanates from the looming clouds. The Virgin's foot and brocade cloak (detail, above) are handled with great refinement. Dosso was first and foremost a painter of light and a virtuoso of the brush.

Crash, Slam, Boo

BY RICHARD CONNIFF

OUT ON THE RACETRACK, THE MONSTER trucks are flying through the air and coming down, *whump*, on cars much like the one in which I am about to make my debut as a demolition derby driver. The crowd roars, and my guts feel as if I have been sipping 10W40. As we await our start time, all 22 demo cars are lined up out by the back fence in the pit area—big old Cadillacs and Dodges from the 1970s, freshly rescued from the junkyard for one night of bone-thudding, metal-rending destruction. The other cars are crisscrossed with welding seams like scars on an old knife fighter's face. They have names like Nut Job and Death Wish Racing.

My car is a sparky little 1984 sedan formerly driven by an elderly couple on their way to daily mass. I have spray-painted the name Dragonfly on the fenders and also, according to the custom of the sport, my wife's name (though my wife, as it happens, has no clue what I am going to be doing tonight). One of the drivers takes a slug of beer and yells, "You gonna die, Dragonfly." He contemplates the sublime power of poetry. Then he yells, "You gonna *die*, Dragonfly." Another driver surveys my car sympathetically. "This is a target car," he explains.

PHOTOGRAPHS BY JOE MCNALLY

THE DEMOLITION DERBY IS AN AMERICAN INSTITUTION — OR SOMETHING LIKE THAT

m!

Before competing in his first demo derby, the author sits on Dragonfly and ponders life in the crash lane.

ORANGE CRUSH TEAM

In the middle, with his girlfriend, Cassy Roggio, Orange Crush's intrepid driver, Pete Mikos: "One of the Snap-on girls blew me a kiss."

"The fellas can't hit the fellas till the target cars are gone." Somewhere out in the darkness, one of the fellas lets out a demented cackle. Then the monster trucks finish, and a terrible pall of silence descends on the track. "Time to go play," one of the drivers yells, climbing in through the window of his car.

All around me, battered old junkers begin to rumble and snarl, most of them for the last time in their lives. I pull on my helmet and survey my world. The interior of my car has been gutted. There is a metal rod sticking out of the transmission hump, in place of the automatic shift on the column. There's a motorboat gas tank where the backseat used to be, because rear-end ramming is the preferred tactic in a derby. (Much better to have the tank here with me in the passenger compartment.) The windshield is still in place for protection against airborne auto parts, but the other windows are gone and the doors are chained shut to keep them from flying off on impact. It occurs to me that my helmet has no face mask. When I bend forward, my head intersects the top of the steering wheel at about the bridge of my nose. And yet . . . Dragonfly comes to life as if of its own will, as if yearning for the apocalypse. From somewhere outside, a disembodied voice cries, "Hang on!" A track official peers in my window for a safety inspection (yes, I have a spare seat cushion duct-taped between me and the driver's-side door), and then I gun the engine and roll out into the arena. Dragonfly finds a position nosefirst against the track wall, the better to rear-end any car that comes in range, and the countdown begins.

I have been preparing for this moment—avoiding it, really—for a year now, since I witnessed my first "demo" at a racetrack on Long Island. Long Island is where the demolition derby, an event somewhere between sport and felony, was invented about 1960. A stock car driver named Larry Mendelsohn generally gets credit for the incredibly dumb, ingenious, all-American idea that racetracks should sometimes spare people the tedious business of watching cars go round in circles. Midwestern rivals sometimes credit a Wisconsin used-car dealer called Crazy Jim. But the basic idea is the same: cut to the crash, cut to the crash, cut to the crash, until the track is littered with smoldering auto parts and only one car is still moving.

Even now, almost 40 years later, the idea embarrasses race fans a little. They do not decorate their double-wide homes with posters of great demo drivers. The winner of the demo does not get a big kiss from the Snap-on Tool girls, who ornament racetracks in their short shorts and bikini tops. "This is the bottom of the barrel. It's the sewer. It's the lowest thing in auto racing," Buddy "The Body Man" Johnson, a demo mechanic, says proudly.

Even people who promote the demolition derby tend to do so with accidental masterpieces of faint praise. "It appeals to a more general crowd," one track owner says, adding that a demolition derby can boost race night attendance by as much as 20 percent. "You don't have to understand racing. You don't have to understand anything."

And yet the unspeakable charm of destruction draws people to demolition derbies at more than 750 county fairs each year, plus assorted racetracks. Destruction also attracts the drivers, who demolish not just automobiles, but also, on occasion, school buses, farm machinery, lawn mowers and motorcycles. The prize money seldom covers the cost of the vehicle and the entry fee, much less hospitalization. But drivers come anyway, for the pure and simple pleasure of hitting somebody else as hard as they can with 3,000 pounds of steel. "And you don't go to jail," they murmur afterward, marveling. Serious injuries are surprisingly rare, considering that 10 to 20 vehicles get totaled per night. But now and then, it is true, demo drivers do die at their sport.

I watched my first demolition derby from the scoring tower at Riverhead Raceway on Long Island, where a longtime track scorer introduced herself, "My name is Marie. I'm the official booer for the guys who are cheating in the backstretch."

"Cheating?" I said.

Demolition derbies, Marie explained, have many rules, one of which actually matters: you must hit somebody once every 60 seconds, or you're out. The trouble is that you win the demo by outlasting the competition, which generally means *not* hitting them any more than you have to. Moreover, experienced drivers often spend weeks getting their cars ready, and they like them to last more than one night. "They play possum," she griped. "They sort of come around and gently glide into somebody. I get aggravated. You want to go down and beat them up yourself."

Below us, a crash sent up a shower of sparks, and the air filled with the smell of burning rubber. "That was a sissy hit," Janice, the other track official, complained. Smoke began to fill the track. Cars clotted together in a din of crumpling metal and squealing tires. Two cars were out almost immediately. Another hobbled backward around the track on a flat tire. "Number 51, thirty seconds without hitting," Marie yelled through the intercom to her son, who was the starter. Then more adamantly: "If 51 gets anywhere near you, wave the yellow flag at 'em. Next time it's going to be black."

A station wagon named Orange Crush began to interest Janice and Marie on account of suicidal recklessness. Most demo drivers drive backward, to protect their cars' vulnerable front ends. Crush was running the full length of the track in forward gear, at 40 miles an hour, and with his elbow sticking out the window, Sunday-driver-style. "Get him, Crush!" Marie yelled, as the station wagon flung itself headfirst into the melee.

"Come on, Crush boy!" Janice concurred.

But Crush, a tow truck driver in real life, was soon running on his wheel rims, trailing a bright train of sparks. After 15 minutes, the only drivers still going were a couple of cagey veterans, and to Marie's chagrin, the winner after a final showdown was Number 51, a driver known in the deeply disparaging language of the demo for "doing laps."

Down on the track, blue smoke and radiator steam drifted past at eye level. A pool of leaked transmission fluid seeped across the blacktop, red and translucent, like a bloodstain. One of the drivers was attempting to explain the attraction of the demolition derby. "It's better than sex," he said, and none of the other drivers bothered to disagree with him. Then he added, "You last longer and you don't leave a mess." There was a moment of thoughtful silence with the panorama of ruined cars hissing and burning all around them. "Well," he conceded, "you leave a little mess."

The driver of Orange Crush, Pete Mikos, came bounding across the track. He was short and muscular, with a hickey on his neck and a ring in his eyebrow. The judges had named him "Fans' Choice," and he was beaming. "One of the Snap-on girls blew me a kiss," he announced. For a demo driver, this was almost as good as it gets.

That first night, demolition derbies interested me from a strictly intellectual perspective, much as might any other

VINNY BELFIORE

"Vicious Vinny," Benison sneered. "The Italian stallion. He's gonna go out there with his mother's picture and the rosary on the dashboard."

all-American, Saturday-night, sociopathic phenomenon. But I soon realized that I was not going to be able to keep my critical distance. I was having brunch the next morning with my friends Alexandra, a garden designer and all-around aesthete, and her husband, Marty, a tree surgeon with massive hands and a high, looming brow. They wanted to know why people drive in demolition derbies, and they weren't buying Snap-on Tool girls as the answer. Marty recalled that the Soviets used to cite demolition derbies as a prime example of American decadence. But he figured all those wretched workers in the proletariat merely gawked and said, "Let's go to America, they've got so much money they can smash up perfectly good cars."

Maybe Americans like to smash up cars, Alexandra suggested, because of their deep hatred for them, and because of the feeling that the earth is spinning into ruin, in large part thanks to the automobile. But the people who do it *love* their cars, I said. I'd seen one demo driver in a T-shirt with a slogan cribbed from Flannery O'Connor's *Wise Blood*: "No man with a good car needs to be justified." She countered that they love and hate them equally, and the demolition derby was where the dark half of this relationship flowered.

Another guest, a singer of lieder, refined this idea. We build machines to get control of our world, she said, but our machines have this infuriating knack for getting control of us instead. So every now and then we seek revenge.

"I think it's Celtic rage," Marty said. He sometimes spends an hour trying to persuade a customer to save a tree, he explained, but when he fails, some battle-loving, earth-smashing impulse floods through him. The chain saw roars. The sawdust flies. Branches crash down. "It's really good if you have a bulldozer," he said.

The two women were now nodding placidly. What the flower arranger, the lieder singer, the tree surgeon and all the demo drivers seemed to have in common was the urge, when the world presses in too close, to strip naked like an old Celtic warrior and run screaming into battle. And at that moment, somewhere in the back of my mind, Dragonfly took wing.

Over my next few visits at Riverhead, I noticed that the same drivers kept coming back for the demo derbies. "Everybody's a regular," one of them explained. "People don't just wake up and say, 'Let's crash cars.'" What was stranger was that many of the same cars kept showing up, though they usually got shorter by the week. ("The car packed good. It crumpled straight," one driver explained.) They came back with trunks skewed up at weird angles or with jagged holes in their inward-buckled tailgates. Fenders got twisted and ripped and folded over themselves, all the smooth, shiny steel bunched up into jagged little knots and ridges and valleys. As bits of the body fell away, the bumpers tended to stick out like battering rams, and it dawned on me that these cars had not come out of somebody's driveway just on a whim.

A disproportionate share of the demo cars seemed to come from J & C Auto Salvage in Lindenhurst, New York, and when I visited there, the owner, Bobby Benison, had a demo car up on the rack. With a bolt cutter, he cut loose the gas tank, which dropped to the floor and got carted out of the way. Then he began welding together the spider gears in the rear axle, to give the car traction in both rear wheels, and the blinding white flame of the stick welder lit up the shop. "Demo drivers are a certain breed," Benison yelled out to me, switching now to the acetylene torch. "Retarded, basically. No, I'm joking with you. Thrill-seekers. An accident where two people would have gone to intensive care, guys are taking off their helmets and laughing as they walk away."

A veil of sparks showered down around him, and excess bits of the car clanked down on the floor—the exhaust, the emergency brake line, the reflector shield from the exhaust, anything that might drag under the car and get caught in the wheels. Smoke rose from the chassis.

Benison, who was about to become my demo guru, was built short and solid, like a forklift. He had a white rag tied pirate-style over his scalp, against sunlight and grease, and he had a big, beefy face, with thin, shrewd eyes, a little puffy underneath. As a teenager, he used to stage

impromptu demos on the streets of College Point in Queens. Later he drove in racetrack demos under the name The Killer Bee.

"We're none of us angels," he said as he worked. "There used to be a time I'd take these bolt cutters and knock your front teeth out and think nothing of it. A guy told me, 'Imagine if you spent all that energy doing something positive,' and I thought, holy cow, he's right." Benison pulled up the leg of his pants to show me a tattoo of the crucified Christ on his calf. "I have seen the light," he said. Now he owns three salvage yards and a repair shop and gives his daughters all the things he never had. Rebuilding cars for demo drivers is a hobby, a way to channel some of that old negative energy. "I'm just the idiot who works for the idiots in the sport," he said.

Benison brought down the lift, and as the car settled onto its snow tires (for better height and traction) he reached for a big ball-peen hammer. He flipped the hammer around to the ball-peen side, which had been filed to a point, whaled back and whipped it down, punching the first of a series of holes in the car body, for chaining down the trunk and the hood. He switched back to the acetylene torch to cut the holes around the hood, "'cause it's the front of the car and it has to look nice." Then he raised the car up on the lift and started to cut away the fenders around the tires to reduce the likelihood of punctures. Molten plastic dripped onto the floor from the wheel well liner, which had caught fire. Benison made fire-truck siren sounds, "*Rrrrrr-rrrrrrrr-rrrrroooo*," and continued cutting with his acetylene torch.

Benison's mechanic, Vinny Belfiore, busied himself wrapping duct tape around the distributor cap and wire-tying the radiator in place. "Duct tape and wire ties hold racecars together," he explained. Belfiore has sent hundreds of cars onto the demo track, and now he was contemplating driving in a demo for the first time. Benison egged him on. "Vicious Vinny," he sneered. "The Italian stallion. He's gonna go out there with his mother's picture and the rosary on the dashboard." Belfiore laughed him off. In case rosaries and duct tape aren't sufficient protection, he told me, some of the regulars also weld angle iron in the front part of the chassis out to the bumpers and put crash bars across the passenger compartment. Their cars are like tanks. Or as one driver bragged to me, "I welded it till it was a solid box. It was like the Flintstones' car."

"One other problem I foresee," Benison was saying. "Aluminum hood, my brother. It's strong, but it's not strong. You take a good shot in the front and it'll rip, which is good. It won't come through the windshield." But he decided to replace it anyway, with a steel hood. This was going to be my car, Dragonfly, and I slept better that night for the thought of a good, solid-steel hood coming clean and unripped through my windshield.

I made a few more trips to Riverhead in the way of research. The demo was always the last event of the night after a full schedule of races. Inside the fence, in the pit area, stock car crews bustled efficiently around neat little work areas defined by shiny Haulmark trailers, racks of new tires, floodlights and lawn chairs. They had generators and air compressors. They had sponsors such as Gershow Recycling Corporation. Outside the fence, in the darkness and dirt, the demo drivers loitered on the fringes of the parking lot equipped with duct tape, chains and too many cold beers. They shouted mild abuse at one another and nursed their peculiar rivalrous friendships.

"Primmy," a driver named Joe Palmeri said in jest, "is a low-down, lyin', cheatin' S.O.B., and you can quote me. He'll tell you himself." I repeated this remark to "Wild Man Primmy," a.k.a. Jimmy Hummel, whose car, Number 51, had gotten a warning flag in the previous race for not hitting. He replied with his trademark demented cackle. Primmy, a home-improvement contractor, said he'd been driving demos for 18 years. "You learn a few tricks. They're all jealous 'cause I've won three races."

"You gotta be aggressive. Your head's gotta spin like that girl in* The Exorcist. *If there's 22 cars, you gotta know where 23 of them are."

BOBBY BENISON

Palmeri's wife, Anne, was meanwhile regarding her husband with a look of sweet contentment. "When Joey gets in a demo, he puts his brain in a box," she said. "He loses it. He snaps." The thought seemed to please her. "One time he got hit in the driver's-side door." Hitting the driver's door is the single unforgivable transgression in demo driving. "They both got out of their cars. This was during the race. He couldn't hit the other guy in the head because of the helmet. So he just kicked him right where it hurts." She smiled. "Afterward, he's great. He's happy. It doesn't matter how good he does, or how bad."

The other nice thing about the demo, said Anne, who is employed as a human resources manager, was that her husband could go off by himself on a Saturday night and have no prospect of meeting other women. "Who the hell is he gonna meet?" she asked. "Have you looked around at these people?"

Just then Pete Mikos drove up in his tow truck with a date named Cassy Roggio, who had blonde-streaked hair and striking dark eyebrows. "Is she your girlfriend?" someone asked him.

"Not yet," Mikos replied. But his car, Orange Crush, had her name painted on it, and she already had the demo attitude down pat. "The other races? The ones that go round in circles?" she said. "They're boring." It turned out that Mikos had met her at a demo. But looking around at that night's crowd, you would have to say that Anne Palmeri was mostly right about dating prospects in the demo world. Cassy was the exception that proved the rule.

One week, Riverhead declared that its upcoming demo was going to be the grand finale, and it kicked up the prize money from the usual $400 to $1,000, in the hope of drawing more cars. There are, it seems, not only relatively few people who wake up on a given morning and say, "Let's crash some cars," but there are also fewer cars to crash. Since the oil crisis of the late 1970s, cars have gotten lighter and more complicated. Demo-wise, a car that cuts off the fuel pressure and launches an air bag in a five-mile-an-hour accident is a dud. Many older cars now also end up in entry-level car races of the "enduro" class, going round and round in ignominious circles until they break down or one of them wins.

Even so, 40-odd drivers showed up for the grand finale, among them Pete Sindone, a melancholy fireplug of a man, 39 years old, squatly built, with tattoos up and down both arms. Sindone is the computer geek at Tri-State Auto Salvage, which is also owned by Benison. Bent on breaking a streak of four second-place finishes, he was out to win the grand finale. He was also nursing a grudge against "Cousin Petey" Mikos, the aforementioned driver of the car named Orange Crush, who also happens to be Benison's cousin. As the result of a judge's decision in the previous demo, Mikos had taken the first-place trophy literally out of Sindone's hands. All night long, among all the drivers, such recollected injuries were the grist for blustery, ritualistic shouting matches.

"OK, fatso, it's all-out war," a driver yelled at one point. "I'm talking about ALL . . . OUT . . . WAR." Drivers traded insults in Bobcat Goldthwait voices, all gravel and high-pitched indignation. "We're a bunch of old women with attitudes," said Mikos, who happened, at that moment, to be aloof from the conflict.

Then they got in their cars and hit each other hard enough to send shattered bits of windshield flying across the track. The crowd was crying, "Hit 'em! Hit 'em! Hit 'em!" and so were the race officials, even louder. Between heats, drivers broke out acetylene torches and cut away crumpled chunks of car body. Melancholy Pete Sindone ripped the chains from a wrecked car and transferred them to his own car. "It got a little dented," he said ruefully. In one heat, a car got hit from both ends, snapped its driveshaft and jackknifed in the air at the doorposts. Another

"Primmy," another driver said in jest, "is a low-down, lyin', cheatin' S.O.B., and you can quote me. He'll tell you himself."

"WILD MAN PRIMMY"

car continued to hit with its wheels splayed out in a duck waddle to the sides. A cloud of atomized rubber hovered over the track. Orange Crush and car 666, old rivals, went after each other hard enough that someone's door cushion came flying out the window. Orange Crush caught fire but continued to hit until Pete Mikos finally leapt out of his car, both fists raised. In the end, the only car still moving belonged to Pete Sindone, whose second-place streak was now broken. The thought of it made him even more melancholy than usual. "I took lessons from Primmy," he said abjectly. "I snuck right through the crowd. I'm not happy. My friend Pete Mikos told me I took him out of the race. I don't even remember hitting him." Cars hissed and burned all around. The crowd, sated now, filtered out into the night. An ice-cream truck played tinkly music, and the truck-top figure of Mister Softee, with his swirl-cone head and his bright-red bow tie, seemed to cruise along just above the track wall, smiling down idiotically on Armageddon.

"Why do you want to do this?" Bobby Benison demanded, back at J & C Auto Salvage, when I told him I meant to drive in a demo. I had a hunch he could relate to the concept of Celtic rage—and also that it would be preposterous of me to claim it as a motive. So I merely tilted my head slightly and pursed my lips in the way that says, "A man's gotta do what a . . . "

"You want a neck injury?" Benison asked. "You want a back injury?"

"You ever been in a real accident?" Pete Sindone asked.

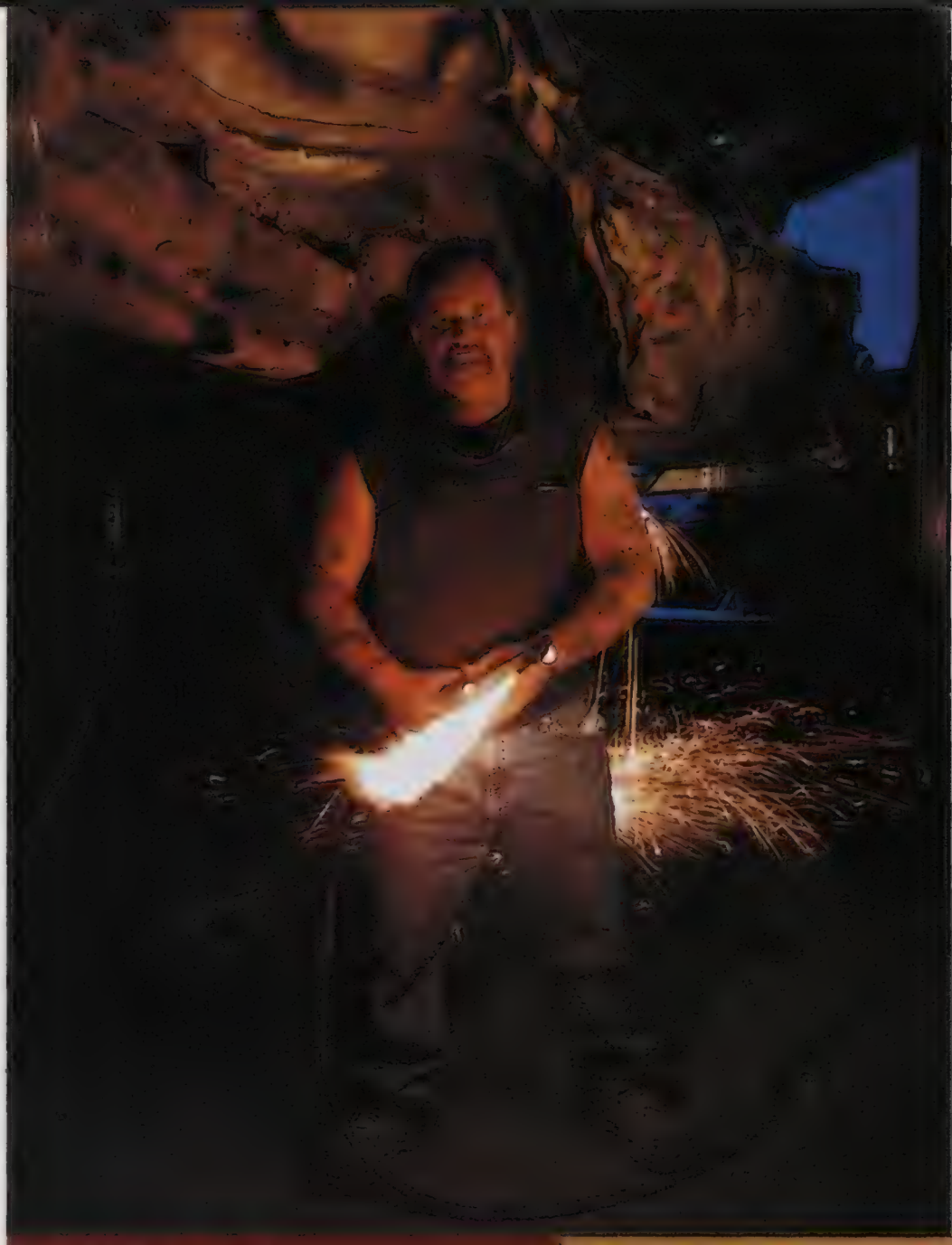
Benison and Sindone began to badger each other ritually about an incident that occurred 15 or 20 years back, in which, Sindone claims, Benison violated the cardinal rule of demo derbies, hitting Sindone directly in the driver's door. "He put me in the hospital," Sindone boasted. "I had to be taken out of the car with the jaws of life."

"The reason you got hurt is you weren't paying attention," Benison replied. To me he said, "Get in Pete's car and let's see what you can do." The car was a 1974 Impala, the winner of Riverhead Raceway's grand finale. It looked as if it had been around the block a few times, and had hit every car on the way.

"Take it right up to that car there," Benison said, indicating a Toyota across the end of a row of stacked cars in his junkyard, "then back it up to me."

I managed a geriatric roll forward to within about eight feet of the Toyota, then, after fumbling around to find reverse, trundled back again. Benison leaned in the window. "If you do what you just did," he confided, "you're going to have five guys saying, 'This guy can't find reverse,' and they'll jump all over you. Try it again."

This time I got within four feet of the Toyota.



PETE SINDONE

"We might as well go out and wreck 'em now. Go out in a blaze of glory. You're going out into the hardest hitting derby you can get into."

"It's a demo car," Benison yelled over the thunder of the engine. "You're not selling it. Beat the hell out of it."

A crowd of junkyard workers gathered to watch, hanging off a big yellow forklift. Benison leaned in my window and remarked, "You probably never laid a patch in your life, did you?"

He lifted his bristly eyebrows in dismay at the dismal piece of work that had been set down before him. Then he began to explain: "Demo is a mental thing. You can't be an average retard. You come up against a big Chrysler in your denty little Dragonfly. *What are you going to do?* Are you going to take him on head-to-head? No. You stay close. Don't give him any room. It's like a little boxer going up against a big guy. You harass him." He moved in close and made a flurry of small punches at the air. "*B'bipp-b'bipp-b'bipp-b'bipp-b'bipp*. You want to henpeck him to death. Concentration is important. You get a guy mad, he can't think." Sitting in the wrecked 1974 Impala, I did not feel exactly like Luke Skywalker, but it occurred to me that Benison was becoming my Obi-Wan Kenobi (with maybe a little Jabba the Hutt mixed in).

"It's scientific. Primmy's going to come out with a car

that has a weakness in both wheels. So you hit him in the front wheel and the steering box pops out. Then you pull away a little. You see the rear wheel. It has a weak axle. You hit him again. *Boom!* He can't steer. He can't drive. He can't come after you.

"Now you see Pete coming. He's chasing you. *What are you going to do?*"

"Duck behind some other car?" I suggested.

"At 50 miles an hour? Going backward? What you do is, you let him catch you. You slow down, so you're both doing the same speed. As he hits you, you spin out of the way, and then you throw it in drive and you hit him back. You gotta be aggressive. Your head's gotta spin like that girl in *The Exorcist*. If there's 22 cars on the track, you gotta know where 23 of them are. Because the one you don't know is going to hit you."

CAR 666 TEAM

Mechanic Buddy "The Body Man" Johnson, left, with driver Bob Conner: "This is the sewer, the lowest thing in auto racing."

I smiled uneasily. Benison regarded me balefully. "You see those pearly whites?" he said, indicating my smile. "Wear a full-face helmet. Because you *are* gonna hit the steering wheel."

Sindone started to rib Benison again about the time Benison put him in the hospital. Benison rolled his eyes. To me he said, "It's dust and dirt and smoke and you can't see anything. What's the best way to get through it? Go as fast as you can. And what's at the other end? Pete." Then he walked away, laughing.

My demolition derby is Riverhead's first of the new season, and the good news is that the rules have changed. Entrants will no longer be able to weld down trunk lids, car doors and other moving parts, or weld and reinforce the chassis into a solid-steel, bumper-to-bumper battering ram. No more beaded welding scars, no steel plates patched on like botched surgery. Drivers will be smashing street cars like Dragonfly out there. The idea is to open up the demo again to the average fool who might not have $2,500 worth of welding gear in the garage. Moreover, unwelded cars tend, in a demolition derby, to get demolished. No more eternal demo cars, resurrected for four or five Armageddons a season.

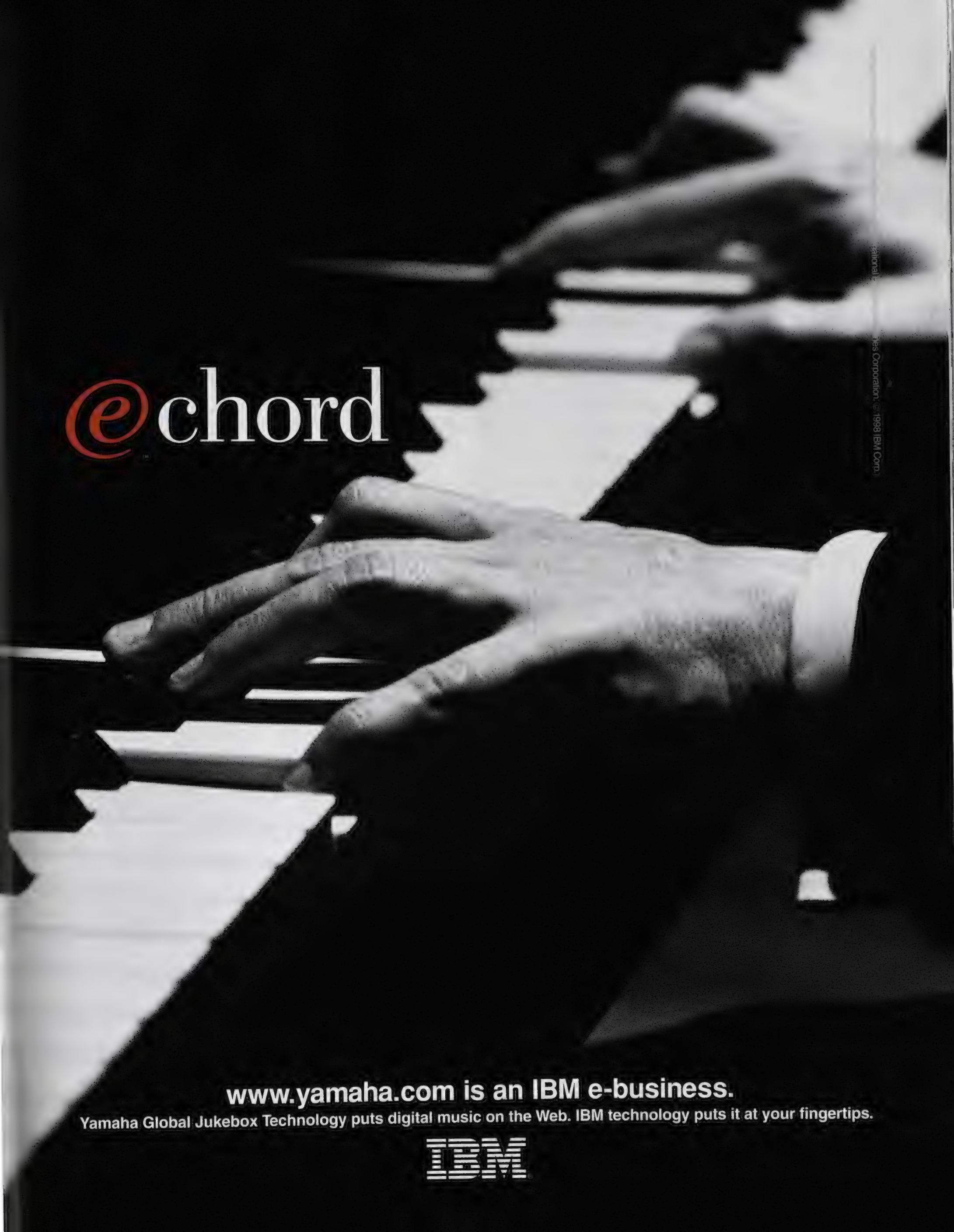
Here's the hitch. The track has decided not to enforce the new rules until the second demo of the season. Call it sentiment. Call it the last hurrah. For this one night, all the old battle-axes are coming out bent on destruction.

"We might as well go out and wreck 'em now," says Pete Sindone. "Go out in a blaze of glory." Also, in case this is not sufficiently destructive, the track has invited back certain oversize cars, the Lincoln Continentals and Cadillacs, formerly banned for safety reasons. The rule against driving ambulances or hearses will, however, remain in effect. "You're going out in the hardest hitting demo you could get into," says Sindone. The thought seems to lift him out of his melancholy. "This is the last time the big boys can come back."

For me, on the other hand, the thought is deeply depressing. My appetite vanishes for days beforehand. I wake up with a recurring nightmare about a demo derby in which the Dirty Dozen drive panzer tanks, and I have to face them in an Opel Kadett. Out at Riverhead for the big night, my mouth is dry, my legs weak, my stomach floaty. All the fellas are back. Mikos shows up for the season with Cassy Roggio in his truck, and Orange Crush in tow, and it has the look of a demo derby love story. He's talking about winning a few more demos, then giving it up and using the prize money so the two of them can take a big trip out West, maybe to Vegas. Someone asks if they're living together. "Not yet," he replies.

Benison has delivered Dragonfly to the track with a distinctly mixed message. There is a Saint Christopher medal pinned over the steering wheel—and what looks to me like a target painted on the driver's-side door.

As the countdown begins, I find reverse gear. The crowd shouts, "Three . . . two . . . one!" and I remain dead still, nose against the wall, conscious of Benison's sage advice: "The most dangerous time in a demo derby is the first minute, because every jerk in the world is out there trying to impress his girlfriend." After a judicious pause, I punch Dragonfly's accelerator, roll backward into the fray and get my first hit. ("That wasn't a hit, that was a tap,"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Mikos says afterward.) The effect is magical. All my anxiety vanishes, and though it is strange to say, everything suddenly becomes serene and exhilarating. Maybe it's delirium. Maybe it's endorphins. Maybe evolution has equipped us with some special, altered state of consciousness for giving and receiving violence. I feel no anger, no Celtic rage. But, heaven help us, it does seem perfectly natural, perfectly good, to be out there hitting people, and getting hit.

Most derby drivers' moms would not care to be associated with demo cars, big old junkers held together with wire and tape.

Dragonfly careens around the track with the other cars in a skidding, shuddering mass of steel and rubber. A huge red car comes veering in off my left shoulder, slamming me sideways, and some distant, dull-witted corner of my brain thinks, "*Whoa*. Good thud." Then it glances away again into the distance. It occurs to me that I am supposed to know the location of every other car on the track, but the truth is, I barely know where *I* am. It feels as if we are all part of some brief cyclone of space debris, swirling noisily together for a moment, before spinning out again into the cosmos.

Then Dragonfly suddenly stops in midtrack. The space debris keeps banging in from all sides. So with a little effort, I get it started again—and instantly find myself up against car 666, a welded monster with the painted word "Redrum" dripping down the tailgate, and vertical exhaust pipes called zoomies shooting flames from all cylinders.

My heart sinks. I recall asking the mechanic for 666 about some of the special tricks his driver used. And I recollect how the mechanic replied, with his eyes glittering, his head bobbing, his weight shifting from one foot to the other, the cigarette in his hand dancing in the dark like a kid's sparkler: "They wouldn't be his specialties if he told you. He'd have to kill you."

But somewhere inside my helmet, I hear the voice of Obi-Wan Benison saying, "Stay close. Harass him." And so I move in, circling as close as I can get, delivering a tap here and a tap there. I have this lingering problem of hitting the brakes on impact, when I am supposed to be accelerating. ("Drive *through* him," the voice says.) But I am at least annoying him and, what is perhaps more important, I never give 666 the room to back up and flatten me. We spin apart into other battles, and then, five or six minutes into the demo, Dragonfly limps to a stop with four crushed fenders, one flat tire and a great hissing cloud of steam from the broken radiator.

Primmy wins the demo. Mikos and Melancholy Pete Sindone end up with their cars locked together so tight it will take a tow truck to pull them apart. The other drivers start to haul themselves from the wreckage, some of them dazed and blinking, others exuberant. Out on the track, I run into the driver of 666, and he looks at me, more than a little surprised, and says, "We went around a few times out there."

"Yeah," I reply, "we did." Then I tuck my helmet under my arm and walk off the track, through the drifting smoke, doing my best to look as casual as Chuck Yeager after a plane crash.

Next day, back home, my wife informs me that Saturday night was our wedding anniversary. Number 17, I think. She is not impressed when I tell her how I spent it, not even when I mention that I painted her name on the side of my car. I get no sympathy for my injuries, a minor but gratifying assortment of banged-up knuckles, bruised shoulders, sore hips and a stiff neck. Discretion coming to me a little late in the game, I decide not to tell her about a remark someone made to me in the moments before my demo: "You'll want to do it again," he said. "Not tomorrow. But one day when you're out driving, you're gonna see it. A '74 Chevy Kingswood wagon, and you'll think, 'Man, that's a car.'"

The moment comes much sooner than I expect. My wife and I are out driving one day that same week when I spot a faded, peeling, 1975 Buick, big as a boat. I point it out to my wife and say, "That's a car I could . . . " She gives me that "get a life" look, and I catch myself in time.

"That's a car," I say, "that somebody could drive in a really good demolition derby."

Richard Conniff wrote about termites in October. Photojournalist Joe McNally lives in Hastings-on-Hudson, New York.

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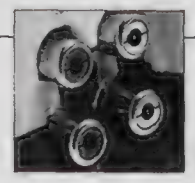

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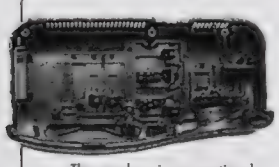

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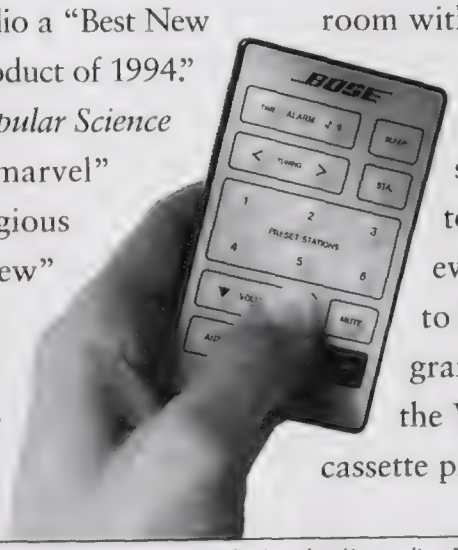

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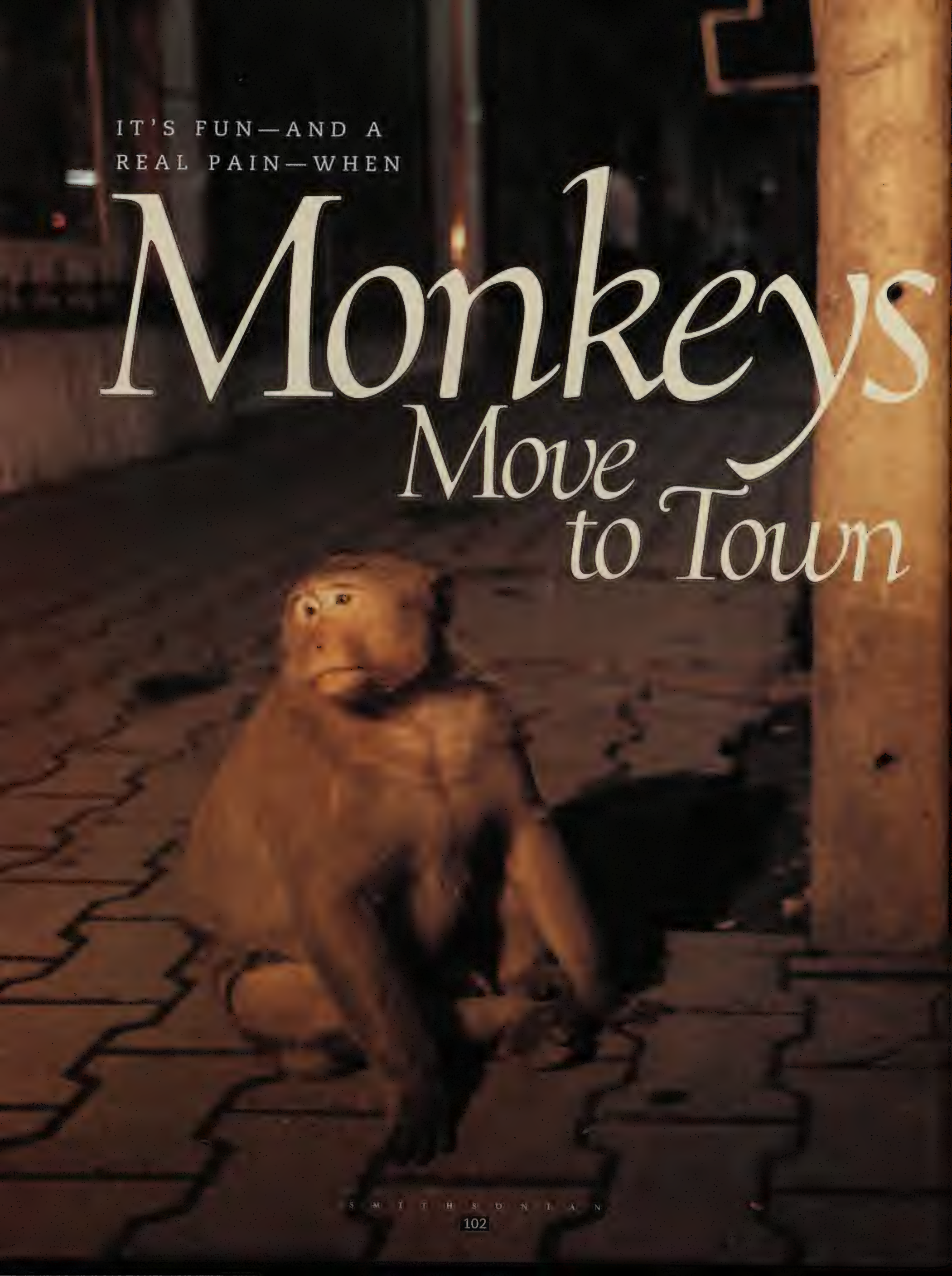


IT'S FUN—AND A REAL PAIN—WHEN

Monkeys Move to Town

PHOTOGRAPHS BY JIM LEACHMAN

RADIATING OUTWARD FROM THE TEMPLES WHERE THEY WERE sacred—or at least protected—monkeys have dispersed to become street urchins in Asian cities from India to Indonesia. City dwellers sometimes enjoy their antics, but having the animals around is not all fun. They raid agricultural fields. They beg for food, and they'll steal it if given half a chance. They hassle passersby. In one city in India, no less than 95 percent of those interviewed said they had been harassed by monkeys; some had been bitten. A young child fell to his death when attacked on a roof by a group of monkeys.

Monkeys have been tolerated and even welcomed in temples for hundreds of years. In many cases, however, entire cities grew up around the temples, and the monkeys could no longer retreat to the forest even if they wanted to. Already accustomed to being fed by people, they moved out into the cities. To a biologist, they are commensals, literally "those who share the table." Technically, the term means an organism that derives a benefit from its host (in this case, food) without having any effect on that host's survival.

The rascally behavior of today's urban monkeys is a far cry from the legendary exploits of Hanuman, the monkey god in Hindu culture. When Rama, the Indian prince, could not get to the island of Lankah (now Sri Lanka) when his wife was abducted there, Hanuman summoned his troop of monkeys to form a bridge from India to Lankah. Then his monkeys battled the forces of evil, and won. Rama and his wife, Sita, were reunited. Because of Hanuman, monkeys have been special for Hindus.

Most of the images on these pages are from Lop Buri, a town of 40,000 residents about 90 miles from Bangkok, Thailand. (The country is largely Bud-

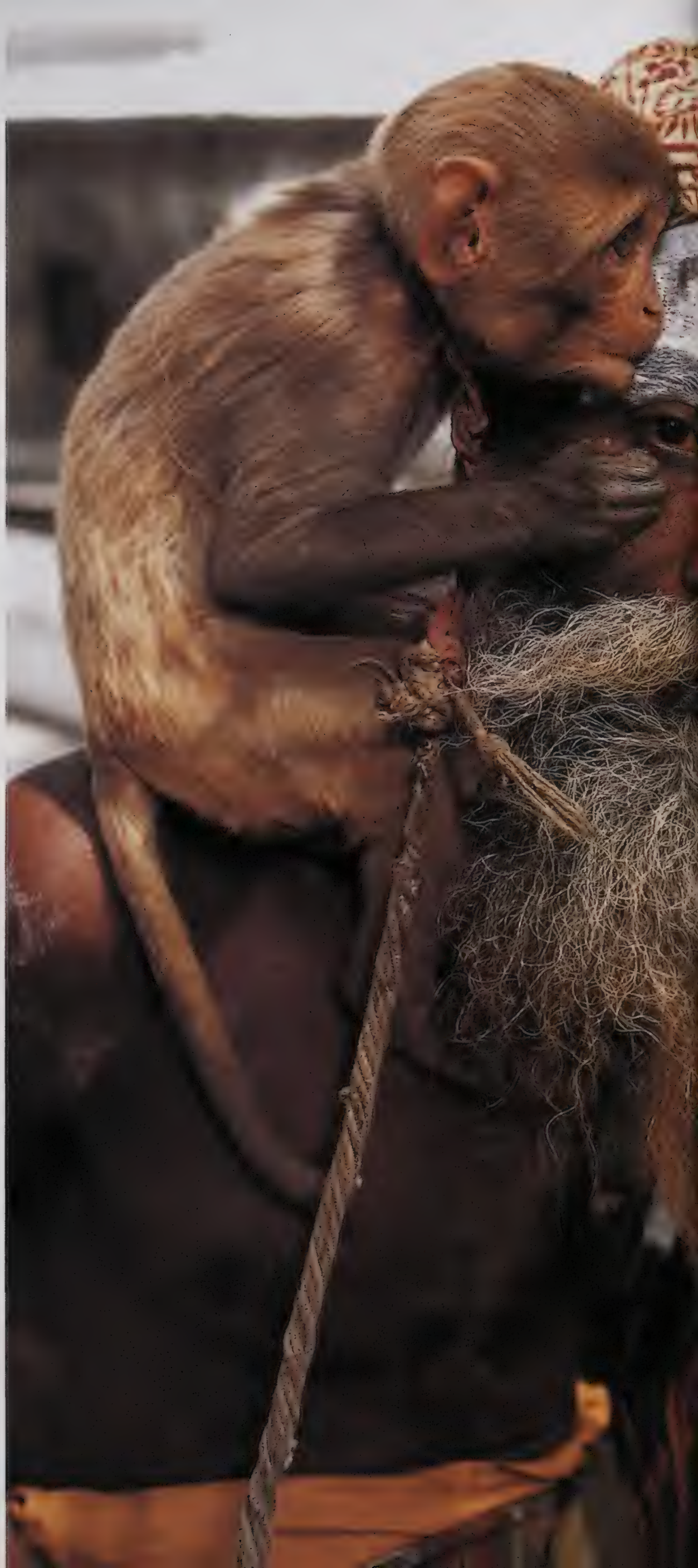
An adult male monkey comes to the end of another day in Lop Buri, Thailand. This individual may be a hybrid of two species.

dhist, which means animals are tolerated to a greater degree than in Western cultures.) All the monkeys are macaques. The species of macaque to be expected in the Lop Buri area is the long-tailed, or cynomolgus, monkey. Some of those pictured here appear to be hybrids, however. Charles H. Southwick of the University of Colorado, who has studied macaques for 40 years, says it is common for people to acquire young rhesus monkeys as pets and then let them go when they grow too large. This could explain the hybridization around Lop Buri.

In a few cities monkey populations grow exponentially, even when some of the animals are trapped and relocated. In others, especially in Nepal, populations are stable, apparently kept in check by disease and limited food. The level of aggression varies widely, too. At Sangeh in Bali, monkeys will jump on people, steal handbags, even take their victim's glasses. (Having an adult macaque jump on you is no small matter. A full-grown male can weigh 40 pounds.) At other sites in Bali, however, the monkeys are well behaved (from the human point of view).

There are times when money looms larger than Hindu or Buddhist respect for animals. The rhesus monkey, a species of macaque, was once a mainstay of biomedical research. In the 1950s India alone was exporting 100,000 of the creatures a year to researchers in Europe and the United States. For various reasons, export was banned in 1978. Now the cynomolgus macaque is the leading choice for such research.

Their forest habitat may be dwindling, but the rhesus, the long-tailed and many other macaques are doing fine, living on urban detritus. No matter what their faults may be, they are infinitely more interesting than pigeons. —*John P. Wiley, Jr.*



Left: By the Pashupatinath Temple in Kathmandu, a holy man, his face painted with devotional marks, has his young rhesus on a very tight leash. Above: A boy inside a shop in Lop Buri mimics a monkey's openmouthed stare to try to intimidate him. Monkeys tried the same threat on the photographer. Below: A determined monkey grabs an ice-cream cone from a very unhappy child.

Left: This monkey, lounging outside the ruins of a temple, is probably just yawning before a midday nap, but macaques do bite and can transmit a fatal virus. Below: A monkey checks out a trash can at the local 7-Eleven. The creatures have become particularly adept at stealing Slurpees from unwary shoppers.

Above: Monkeys feed at a table set especially for them by a Lop Buri hotel. Once a year, the hotel holds a festival for its primate friends. Right: A homeless woman feeds sugarcane to a pregnant or seriously obese monkey. Having the animal with her means the woman will receive more handouts.

Above: A nursing monkey shares a lottery booth with a woman who sees nothing unusual about it. The mother monkey is particularly gentle and sweet, and many people come to see her—and buy a ticket. The baby is probably less than a month old. Right: Sunset is playtime for juveniles, who chase each other along telephone lines and engage in mock fights. They are occasionally electrocuted when they touch two frayed electric lines simultaneously. When that happens, monkeys avoid those wires for a long time.

Who *Are* Those Guys?

BY RALPH GRAVES

TO ANYONE INTERESTED IN the Civil War, the picture is irresistible. The soldiers' faces are so young, so confident. Their uniforms are so dashing, so jaunty. The picture is published in books, magazines, newspapers, TV documentaries. But wherever it is published, the facts are usually distorted. As Virginia historian Mark Greenough says, "The picture has been misrepresented so often and for so long. They never get it right."

For example, in the *New York Times,* March 7, 1998, the caption reads, "The eager Confederate recruits at left, photographed just before the first battle of Bull Run, had not yet even mussed their uniforms, and the war still looked to them like an adventure."

Sometimes the picture is described as having been made just after Bull Run (July 21, 1861) or just after Fort Sumter (April 12, 1861). The men are "Confederate soldiers" because every writer, editor and historian wants them to be. But they are not. The photograph was taken in November 1859, before the Confederacy existed. They are not Confederate soldiers but Virginia militiamen, the Richmond Grays. The Civil War won't begin for a year and a half. Another thing: the man with the mustache and goatee (top center) is frequently identified as John Wilkes Booth. He isn't.

The photograph is owned by the Valentine Museum of Richmond, Virginia. Teresa Roane, head of Reference Services, gets dozens of requests to publish the picture. Every time she sends it out, she states that these are Richmond militiamen photographed in 1859. "But they always come out Confederate soldiers, usually around the time of Bull Run."

Ken Burns' great TV series *The Civil War* is partly to blame. He used the picture three times: once in the TV documentary, once in the book based on the series, once on the jacket of the video. The descriptions are misleading in the first two, and flatly inaccurate in the third, but the museum is convinced the success of Burns' project has sanctified the notion that these are Confederate soldiers.

The real story of the picture is more interesting.

After his failed raid on Harpers Ferry, Virginia (now West Virginia), on October 16, 1859, John Brown was tried for treason at nearby Charles Town, convicted on November 2 and sentenced to be hanged on December 2. Rumors spread that Northern abolitionists were planning to send a volunteer military rabble to free Brown, and the elite Richmond Grays were dispatched to guard against any uprising. Before they left Richmond, the Grays picked up a camp follower. Actor John Wilkes Booth, then performing in a local repertory company, thought it would be fun to go along for the ride. Only men in uniform were allowed on the train, so two Grays lent him a few pieces of their uniforms and smuggled him aboard.

When they arrived in Charles Town in late November, the Grays found the situation less than exciting. The reprisal raid from the North never materialized. The Grays had ample time to pose in their snappy militia regalia.

The photographer had to be a Southerner, because Northerners were not welcome during the Brown episode. Cecil Eby, a retired English professor, grew up in Charles Town and knows a great deal about its history. He speculates that the photographer was Lewis Dinkle, a county clerk whose sideline was photography. A local newspaper said Dinkle was taking a lot of pictures at the time.

Not all the men are Richmond Grays. The man in the tall hat, called a shako, is Julian Alluisi, a member of the Virginia Rifles. The man in the front, second from left, is Aylett Woodson, a member of the Young Guard. We know about Alluisi and Woodson because their families gave versions of the picture to museums. Nobody in the picture is Booth. Terry Alford, a professor of history who is working on a biography of Booth, says Booth never grew a goatee like the man in the center. "Every time there's a picture of a man with a mustache, they say it's Booth."

Despite all the misrepresentations, the picture will continue to survive because it is a compelling image. Those faces will continue to bear witness to their time and place—late November 1859, in Charles Town—even if everybody says it was some other time and some other place.

When John Brown was hanged, the Richmond Grays stood guard next to the scaffold. When the Civil War began, most of these men doubtless volunteered for the Confederate Army. We know some survived the war. We must assume others did not. But their faces survived.

COOK COLLECTION, VALENTINE MUSEUM, RICHMOND

An "Odd Fish"

who swam against the tide

BY BIL GILBERT

ONE LATE SUMMER DAY IN 1818, the young wildlife artist John James Audubon slipped away from the general store he was running in Henderson, Kentucky, to naturalize along the Ohio River. From a passing boat stepped a stranger with lank black hair and a long unkempt beard. Audubon noted: "His forehead was so . . . prominent that any tyro in phrenology would instantly have pronounced it to be the residence of a mind of strong powers." This big-headed pilgrim wore tight pantaloons and a gaudy yellow coat, and he carried a bundle of dried plants. Speaking in a heavy accent of indeterminate origin, he asked where he might locate Mr. Audubon. Being told he had found his man, this "Original" said, "My dear Audubon, I send you an odd fish which you may prove to be undescribed." Audubon asked where the creature might be. The man replied, "I am that odd fish." He then revealed his identity, and Audubon "felt confounded and blushed," because of his failure to recognize "that renowned naturalist. Constantine Rafinesque himself."

THE PIONEERING NATURALIST CONSTANTINE RAFINESQUE DID JUST ABOUT EVERYTHING, AND HE ALWAYS DID IT HIS WAY

Though his reputation was then truly much the larger, Rafinesque eagerly accepted an invitation to stay with Audubon and investigate the local flora and fauna. At night the

pair classified specimens and played what might be called naturalists' games. For example, one evening Audubon heard a terrible commotion from his guest's room. There he found Rafinesque, buck naked, attempting to catch bats using his host's prized violin as a swatter. Audubon joined the hunt and, using the bow of his now battered violin, bagged a fair sampling of bats. Another time Audubon showed Rafinesque a sketch he had made of a remarkable local fish, called the Devil-Jack Diamond. In fact it was a joke fish, found only in the artist's imagination. But solemnly Audubon explained that the species sometimes reached a length of ten feet and was covered with scales so hard that a man could start a fire by striking them with a steel. Rafinesque took careful notes, and several years later when he published the first book on the fishes of the Ohio River system, he included the Devil-Jack, scientifically christened *Litholepsis adamantinus*. After several weeks of such amusements, Rafinesque abruptly departed without a by-your-leave for Audubon, and headed downstream toward the Mississippi.

Odd fish indeed. Constantine Rafinesque remains a world-class one. Conspicuous eccentricities of dress and manners aside, the intellectual breadth—if not always depth—of the man was enormous, perhaps unique. In this age of the specialist, a Rafinesque might well be treated as a loony. And even in his own time, when generalists were abundant and fashionable, illustrious contemporaries were awed and unsettled by the freakish diversity of his knowledge and interests. Rafinesque wrote, when he was 52 years old, that he had been a botanist, geologist, historian, poet, philosopher, philologist, economist, merchant, manufacturer, improver, professor, surveyor, draftsman, architect, engineer, author and editor,

Original specimens collected by Rafinesque (opposite) include the plant *Polanisia graveolens*, at left, and freshwater clamshells numbered by the naturalist himself.

Rafinesque accepted an invitation to stay with Audubon. At night the pair classified specimens and played what might be called naturalists' games.

among many other accomplishments.

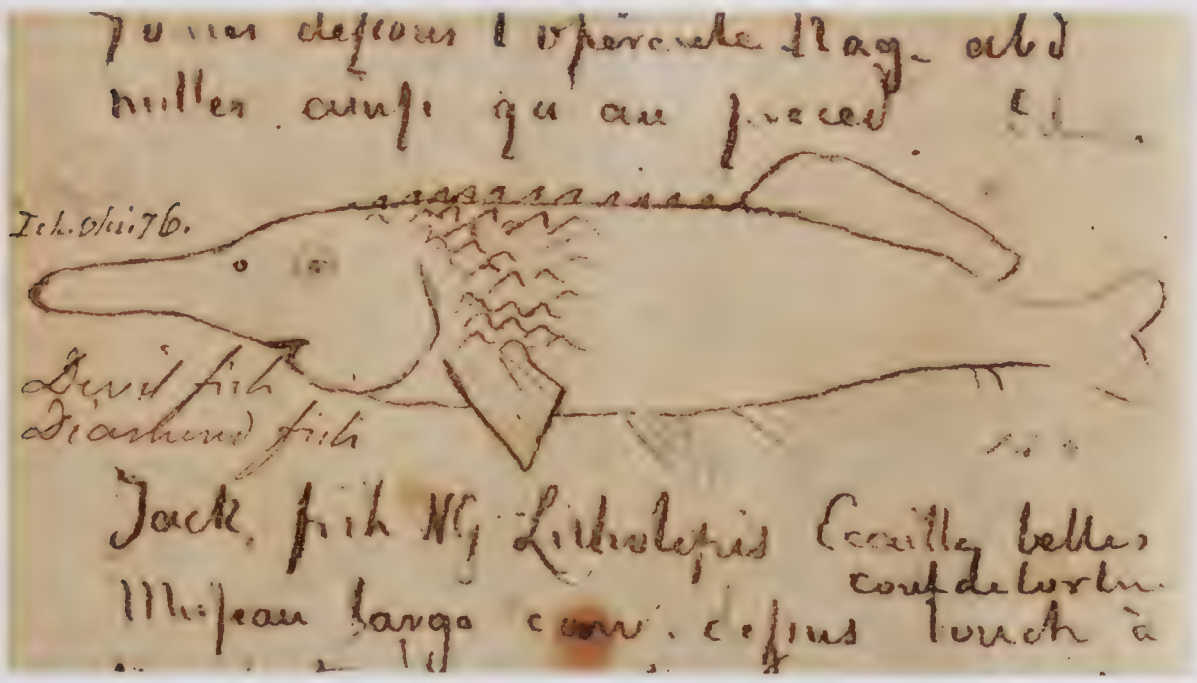
This is a statement of fact, documented by academic, business, literary and patent records; by hundreds of lectures delivered and books and papers published. With equal truth, Rafinesque could have mentioned that he had founded a bank; designed military and agricultural devices; been a commercial brandy manufacturer and mapmaker; and been an authoritative investigator of volcanoes, Kentucky's Mammoth Cave, phrenology, Hebrew grammar and, before Charles Darwin, evolution.

Rafinesque was born in 1783 in Turkey, near Constantinople. His father, a Frenchman from Marseilles, was an international trader who worked for several years in the Levant but had worldwide business interests. (Rafinesque *père* died of yellow fever in 1793 in Philadelphia, where he had been detoured while on a trading trip to China.) His mother was of German ancestry but was a Greek citizen. The affluent Rafinesques moved frequently for both commercial and political reasons, often living with relatives on the Mediterranean littoral. Young Constantine was privately tutored and claimed to have read a thousand books of science and philosophy—variously written in French, Italian, Greek, English and Latin—by the time he was 12. In his spare time he became a keen naturalist, botany being his first and lasting love.

IN 1796 RAFINESQUE WAS LIVING in Italy with his paternal grandmother, who intended to send him off to a college in Switzerland. Instead he ended up collecting plants in Italy and southern France, where he privately studied natural sciences, medicine and mapmaking, and began corresponding with European men of science. In 1802 he decided to go to North America, then a mecca for naturalists. Landing in Philadelphia, he took very light employment with the Clifford brothers, banker-merchants who were associated with his family. Very likely because one of them, John Clifford, was an enthusiastic amateur botanist, and perhaps also because yellow fever had broken out again in Philadelphia, young Rafinesque spent more time collecting in the field than he did clerking in the countinghouse. For the next two years, he roamed the Middle Atlantic region, studying terrestrial flora and fauna but also, as he noted, "Crabs, Shells and Sea plants," as well as "the soil, swamps, sand, downs, marls, islands, strata and fossils." In the process he became acquainted with most of the members of the American natural history establishment: Bartrams, Peales, Rushes, Michauxs and others. They were impressed with his mind but otherwise found him a bit hard to take because, as one remarked, his arrogance "leads him to treat Americans like half-taught school boys."

Stopping by Washington, D.C., the 20-year-old Rafinesque invited Thomas Jefferson to supply plant specimens for his survey of Middle Atlantic flora. Jefferson declined, saying he was too busy being President. Later

In an 1823 self-portrait, Audubon looks every inch the respectable gentleman.



The mythical Devil-Jack Diamond fish, described by Audubon as a joke, ended up as a real creature in Rafinesque's notes.

112 TRANSYLVANIA UNIVERSITY PHOTOGRAPHIC

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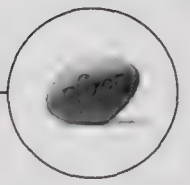
Please see important product information for VIAGRA (25-mg, 50-mg, 100-mg) tablets on the following page.

Let the dance begin.



PATIENT SUMMARY OF INFORMATION ABOUT

VIAGRA®
(sildenafil citrate) tablets

This summary contains important information about VIAGRA®. It is not meant to take the place of your doctor's instructions. Read this information carefully before you start taking VIAGRA. Ask your doctor or pharmacist if you do not understand any of this information or if you want to know more about VIAGRA. This medicine can help many men when it is used as prescribed by their doctors. However, VIAGRA is not for everyone. It is intended for use only by men who have a condition called erectile dysfunction. **VIAGRA must never be used by men who are taking medicines that contain nitrates of any kind. This includes nitroglycerin.**

What Is VIAGRA?

VIAGRA is a pill used to treat erectile dysfunction (impotence) in men. It can help many men who have erectile dysfunction get and keep an erection when they become sexually excited (stimulated). You will not get an erection just by taking this medicine. VIAGRA helps a man with erectile dysfunction get an erection only when he is sexually excited.

How Sex Affects the Body

When a man is sexually excited, the penis rapidly fills with more blood than usual. The penis then expands and hardens. This is called an erection. After the man is done having sex, this extra blood flows out of the penis back into the body. The erection goes away. If an erection lasts for a long time (more than 6 hours), it can permanently damage your penis. You should call a doctor immediately if you ever have a prolonged erection that lasts more than four hours.

Some conditions and medicines interfere with this natural erection process. The penis cannot fill with enough blood. The man cannot have an erection. This is called erectile dysfunction if it becomes a frequent problem.

During sex, your heart works harder. Before you start any treatment for erectile dysfunction, ask your doctor if your heart is healthy enough to handle the extra strain of having sex.

How VIAGRA Works

In many men with erectile dysfunction, VIAGRA helps the body's natural erection process. When a man is sexually excited, the penis will fill with enough blood to cause an erection. After sex is over, the erection goes away.

VIAGRA Is Not for Everyone

VIAGRA is only for patients with erectile dysfunction. VIAGRA is not for newborns, children, or women. Do not let anyone else take your VIAGRA. VIAGRA must be used only under a doctor's supervision.

As noted above (*How Sex Affects the Body*), ask your doctor if your heart is healthy enough for sexual activity.

VIAGRA must never be used by men who are taking any medicines that contain nitrates. Nitrates are found in many prescription medicines that are used to treat angina (chest pain due to heart disease) such as:

- nitroglycerin (sprays, ointments, skin patches or pastes, and tablets that are swallowed or dissolved in the mouth)
- isosorbide mononitrate and isosorbide dinitrate (tablets that are swallowed, chewed, or dissolved in the mouth)

Nitrates are also found in illicit drugs such as amyl nitrate or nitrite ("poppers"). If you are not sure if any of your medicines contain nitrates, or if you do not understand what nitrates are, ask your doctor or pharmacist. If you take VIAGRA with any nitrate medicine or illicit drug containing nitrates, your blood pressure could suddenly drop to an unsafe level. You could get dizzy, faint, or even have a heart attack or stroke.

What VIAGRA Does Not Do

- VIAGRA does not cure erectile dysfunction. It is a treatment for erectile dysfunction.
- VIAGRA does not protect you or your partner from getting sexually transmitted diseases, including HIV—the virus that causes AIDS.
- VIAGRA is not a hormone or an aphrodisiac.

What To Tell Your Doctor Before You Begin VIAGRA

Only your doctor can decide if VIAGRA is right for you. You will need to have a physical exam to diagnose your erectile dysfunction and to find out if you can take VIAGRA alone or with your other medicines.

Be sure to tell your doctor if you:

- have ever had any heart problems (angina, chest pain)
- have ever had any kidney problems
- have ever had any liver problems
- have ever had any blood problems, including sickle cell anemia or leukemia
- are allergic to sildenafil or any of the other ingredients of VIAGRA tablets
- have a deformed penis, Peyronie's disease, or ever had an erection that lasted more than 6 hours
- have stomach ulcers or any types of bleeding problems
- have a rare inherited eye disease called retinitis pigmentosa
- are taking any other medicines

VIAGRA and Other Medicines

Some medicines can change the way VIAGRA works. Tell your doctor about **any medicines** you are taking. Do not start taking any new medicines before checking with your doctor or pharmacist. This includes prescription and nonprescription medicines or remedies. Remember, VIAGRA should never be used with medicines that contain nitrates (see *VIAGRA Is Not for Everyone*). VIAGRA should not be used with any other medical treatments that cause erections. These treatments include pills, medicines that are injected or inserted into the penis, implants or vacuum pumps.

Finding the Right Dose for You

You will learn how well VIAGRA works for you through your personal experience. If you do not get the results you expect, talk with your doctor. VIAGRA comes in different doses (25 mg, 50 mg and 100 mg). You and your doctor can determine the dose that works best for you.

- Do not take more VIAGRA than your doctor prescribes.
- If you think you need a larger dose of VIAGRA, check with your doctor.
- VIAGRA should not be taken more than once a day.

If you are older than age 65, or have serious liver or kidney problems, your doctor may start you at the lowest dose (25 mg) of VIAGRA.

How To Take VIAGRA

Take VIAGRA about one hour before you plan to have sex. Beginning in about 30 minutes and for up to 4 hours, VIAGRA can help you get an erection if you are sexually excited. If you take VIAGRA after a high-fat meal (such as a cheeseburger and french fries), the medicine may take a little longer to start working. VIAGRA can help you get an erection when you are sexually excited. You will not get an erection just by taking the pill.

Possible Side Effects

Like all medicines, VIAGRA can cause some side effects. These effects are usually mild and do not last long. Some of these side effects are more likely to occur with higher doses. The most common side effects of VIAGRA are headache, flushing of the face, and upset stomach.

Less common side effects that may occur are temporary changes in color vision (such as trouble telling the difference between blue and green objects or having a blue color tinge to them), eyes being more sensitive to light, or blurred vision. In extremely rare instances, men may have an erection that lasts many hours. You should call a doctor immediately if you ever have an erection that lasts more than four hours (see *How Sex Affects the Body*). VIAGRA may cause other side effects besides those listed on this sheet. If you want more information or develop any side effects or symptoms you are concerned about, call your doctor.

Accidental Overdose

In case of accidental overdose, call your doctor right away.

Storing VIAGRA

Keep VIAGRA out of the reach of children. Keep VIAGRA in its original container. Store at room temperature (59°-86°F or 15°-30°C).

For More Information on VIAGRA

VIAGRA is a prescription medicine used to treat erectile dysfunction. Only your doctor can decide if it is right for you. This sheet is only a summary. If you have any questions or want more information about VIAGRA, talk with your doctor or pharmacist or call 1-888-4VIAGRA.

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Though his erudition was impressive, his readiness to advertise it made Rafinesque a difficult man to like.

Rafinesque expressed an interest in joining an expedition to explore the Western frontier, particularly Lewis and Clark's, which was then already on the lower Missouri. Sensing complications in landing a position as botanist or surveyor on that one, and lured by a lucrative business deal in Sicily, he returned to Europe. Jefferson did inform him about a spot on an expedition to the Red River, but by then Rafinesque had already moved to Sicily, where he remained for ten years. Prospering scientifically and materially, Rafinesque turned his attention to marine zoology, volcanology, archaeology and linguistics. Soon he was sending off spates of articles on these and other subjects to scientific journals. He married a Sicilian named Josephine, fathered two children—a daughter, Emily, and a son who died in infancy—and became a well-to-do international trader, dealing in medicinal plants and herbs throughout western Europe and Russia. He also started a successful distillery, saying of it, "I made very good brandy . . . without ever tasting a drop of it, since I hate all strong liquors."

IN SICILY AND ON SEVERAL OTHER occasions, Rafinesque demonstrated that he had a knack for making money. But, paradoxically, doing so never appeared to interest him much or for long. Like not a few other naturalists of the time, he was often desperately poor.

By 1815 he was ready to move again. In the summer, he packed up 50 cases of scientific specimens and paraphernalia and set sail for the United States. Reflecting on his time in Sicily, he commented that the island offered "fruitful soil, delight-

ful climate, perfidious men [and] deceitful women." As to relations with his own women, Rafinesque never saw them again. After being abandoned, Josephine formed a liaison with a vaudeville comedian—an interesting choice—and the daughter became an actress.

The ship on which Rafinesque took passage went aground and sank in Long Island Sound, where he lost all his possessions, escaping the wreck in a longboat. Learning of his misfortune, prominent Americans, especially De Witt Clinton and Dr. Samuel Mitchill, came to his assistance. Clinton, then mayor of New York City and later governor of New York, was an avocational zoologist-geologist. Mitchill, at different times a member of the U.S. House of Representatives and the Senate, was a somewhat lesser version of Rafinesque, a know-it-all called by Thomas Jefferson "the Congressional Dictionary." With such patronage, Rafinesque took up where he had left off ten years before, collecting and cataloguing the nature of the Eastern United States, all the while instructing and correcting its naturalists. This time he worked mostly out of New York City, where he was an organizer of the Lyceum of Natural History, the classiest cultural hub in the city. Rafinesque was asked to present a paper at the first Lyceum meeting. Appointed to the program committee, he decided one lecture would be insufficient and therefore gave six, the subjects ranging from meteorology to parasitic worms.

Weeping Willow.
Bitter-Sweet.
JULIET.
I knew her in the prime of her beauty and youth:
When she was the chaste emblem of candor and truth.
But alas! what a change!.....

Rafinesque added pith to his sketch of a Lexington acquaintance with weeping willow and bittersweet.

Though his erudition was impressive, his readiness to advertise it made Rafinesque a difficult man to like. In fact, he is one of the better negative proofs of the adage that if you want to be loved be lovable. He seemingly did not and certainly was not. Of him, David Jordan, a scientist and educator, wrote in 1887: "no more remarkable figure has ever appeared . . . in the annals of science. . . . But Rafinesque loved no man or woman."

In the spring of 1818, having done his best to improve the intellectual climate of New York, Rafinesque left for the West. He crossed the Alleghenies on foot and traveled down the Ohio River. Doing so, he reached Henderson, Kentucky, and Audubon. Thereafter he followed the Ohio downstream to its mouth. On the way back East, he visited the works of the Mound Builders near Chillicothe, Ohio. They "struck me," he wrote, "with astonishment" and later led him to study "the Ethnography and Philology of the [North and Central] American nations."

He ended his trip in Philadelphia. There he calculated he had found

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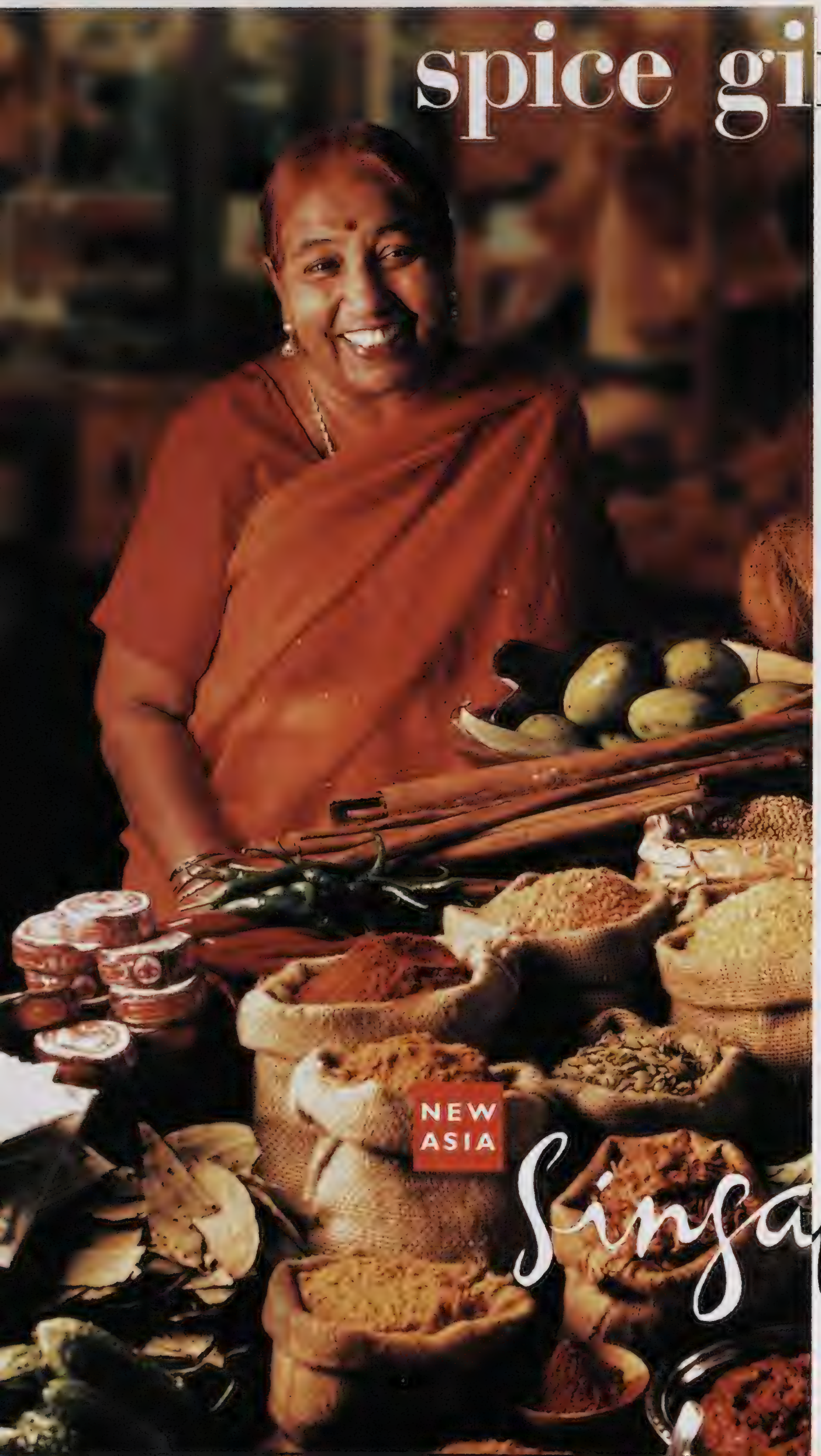

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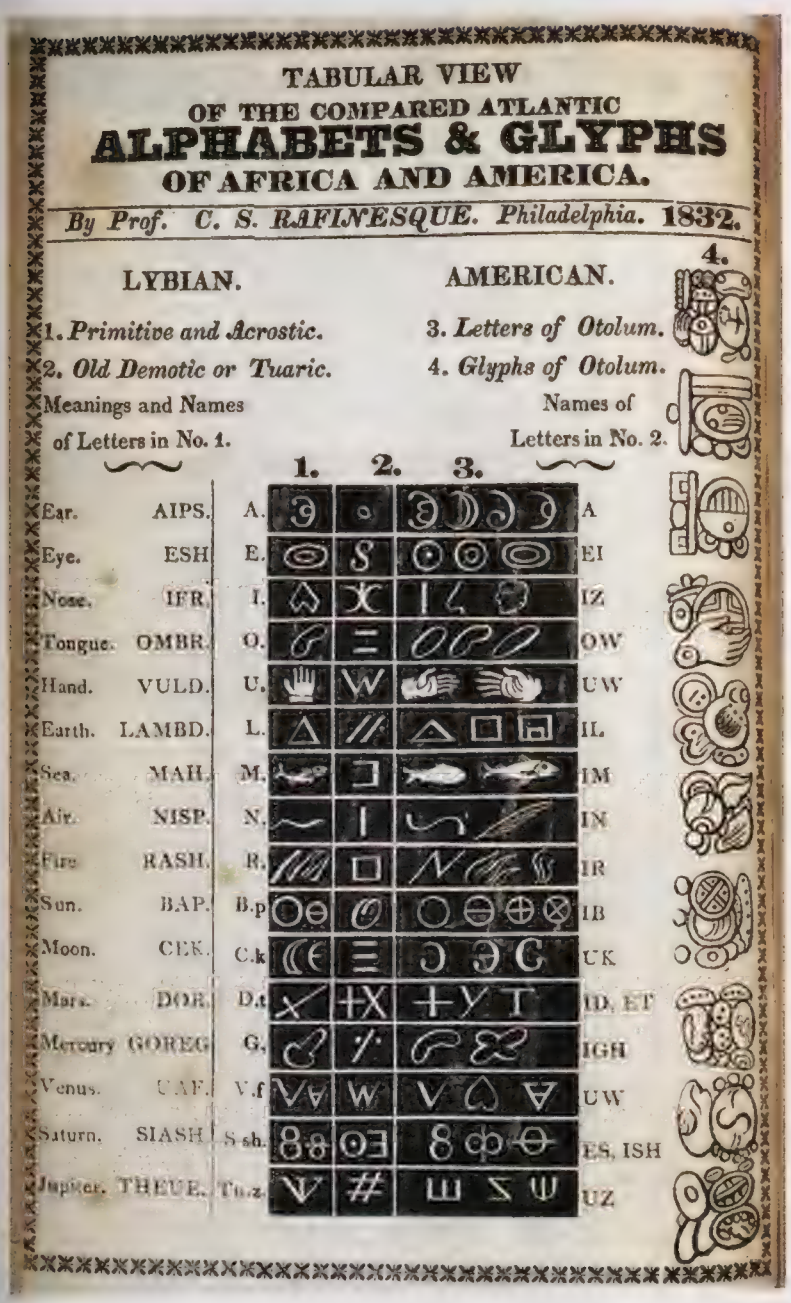
"Abt. 25 species of Bats, Rats and other quadrupeds, abt. 20 N[ew] Sp[ecies] of Birds. Abt. 15 N. Sp of snakes, turtles, lizards, and other reptiles, 64 N. Sp of fishes of the Ohio: more than 80 N. Sp of shells, besides some new worms and many fossils. And in Botany I have collected more than 600 Sp of Plants of which one-tenth part at least are new."

In fact, a number of those species had been described earlier by others. Also, the totals were inflated by the Devil-Jack Diamond and several other imaginary fishes that Audubon had playfully sketched and Rafinesque accepted as real. To put it politely, he was often careless in taxonomical matters. The zoologist S. S. Haldeman wrote in the *American Journal of Science* that Rafinesque's "greatest fault as a naturalist was . . . his passion for 'new species,' and the recklessness with which he proposed them, without sufficiently examining the works of his predecessors." Louis Agassiz, the Harvard arbiter, bluntly observed that Rafinesque had a "prurient desire for novelties." Nevertheless, both of these men and generally other reviewers concluded that the body of his work was large and important; that it was an error of another sort to dismiss it out of hand because Rafinesque was sometimes childishly competitive. Now, his records having undergone professional scrutiny, Rafinesque is credited with first describing more than 100 species of plants and animals.

He spent the winter of 1818-19 in Philadelphia, cataloguing specimens, drafting a map of the Ohio River and writing of his travels. He declined an offer to be a professor of chemistry, even though he asserted that he knew more about chemistry than many of those who taught the subject. Earlier he had campaigned to be a professor of natural history and botany at the University of Pennsylvania, but he did not get the job.

John Clifford (of the merchant family who first employed Rafinesque in the United States) offered him another option. For business reasons, Clifford had moved to Lexington, Kentucky, where he was influential in the affairs of Transylvania University, the first institution of higher learning west of the Alleghenies. He thought Rafinesque would be an adornment for Transylvania. Rafinesque agreed, joining the faculty in 1819. Unfortunately, Clifford died the next year, depriving Rafinesque of


TABULAR VIEW
OF THE COMPARED ATLANTIC
ALPHABETS & GLYPHS
OF AFRICA AND AMERICA.
By Prof. C. S. RAFINESQUE. Philadelphia. 1832.

LYBIAN.
1. Primitive and Acrostic.
2. Old Demotic or Tuaric.
Meanings and Names of Letters in No. 1.

AMERICAN.
3. Letters of Otolum.
4. Glyphs of Otolum.
Names of Letters in No. 2.

			1.	2.	3.	
Ear.	AIPS.	A.				A
Eye.	ESH	E.				EI
Nose.	IFR.	I.				IZ
Tongue.	OMBR.	O.				OW
Hand.	VULD.	U.				UW
Earth.	LAMBD.	L.				IL
Sea.	MAH.	M.				IM
Air.	NISP.	N.				IN
Fire	RASH.	R.				IR
Sun.	BAP.	B.p				IB
Moon.	CEK.	C.k				UK
Mars.	DOR.	D.t				ID, ET
Mercury	GOREG	G.				IGH
Venus.	UAF.	V.f				UW
Saturn.	SIASH	S.sh.				ES, ISH
Jupiter.	THEUE.	Th.z.				UZ

A keen philologist, Rafinesque devised this chart to compare and link the origins of American and African languages.

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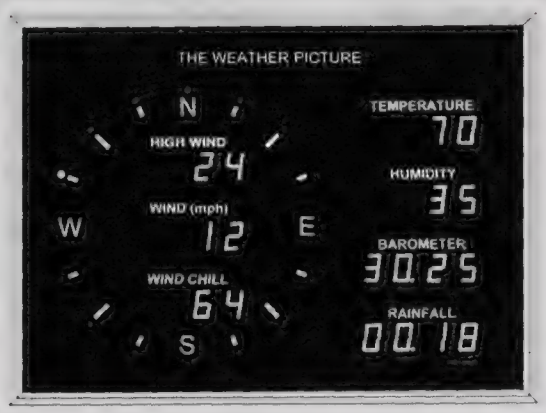

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a patron and one of the few people he seemed to like and who liked him.

During his various stints in classrooms over the years, Rafinesque was, not surprisingly, often a figure of fun. "A corpulent man with a queer French accent [whose] vest worked up to make room for the surging bulk of flesh," is how one pupil recalled him. Another remembered his lecture room as "the scene of the most free and easy behavior made possible by the total absorption in his subject of the lecturer." But a George Jones, who went on from Transylvania to become a military general, wrote that

Rafinesque discusses, in verse, a theory of evolution that predates Darwin's by more than 20 years.

Professor Rafinesque "was very eccentric, but . . . one of the most interesting men I have ever known. . . . His lecture on the ants was peculiarly instructive and interesting."

The Transylvania faculty was less taken with their new colleague and persecuted him because, Rafinesque claimed, "I knew more than they [did]." But he seemed to get along well with Horace Holley, the president of Transylvania. Holley, a Unitarian minister from New England, was an educational progressive who built Transylvania into a superior university that for a time granted more medical degrees than any other school in the country. Political and religious conservatives, considering his ideas much too liberal, persistently tried to get rid of Holley. Rafinesque, the irritating freethinker, further enraged them and worsened Holley's problems.

Rafinesque immediately set about upgrading Lexington's culture, lectur-

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ing on science and philosophy, raising funds for a botanical garden (from, among others, Henry Clay) and in 1821 starting a highbrow magazine, *Western Minerva, or American Annals of Knowledge and Literature.* The writing was done largely by Rafinesque using his own name and various pseudonyms. The magazine contained essays on legislation, moral precepts, astronomy, chemistry, botany, agriculture, manufacturing, archaeology and "female free masonry," and some awful poems. Unfortunately, it died aborning. Rafinesque accused the printer of "suppressing" all but three copies of the first issue. Writing to Thomas Jefferson, he explained: "The principal motives . . . were, that the Journal was too learned, that it dared inculcate political and moral Wisdom, to surmise that the Sun does not stand still and . . . to employ mystification against ignorance and folly &c., &c."

MORE PLAUSIBLY, THE PRINTER trashed the magazine because he feared it was too libelous rather than too learned. That only issue contained several vitriolic essays in which Rafinesque likened various prominent residents of Lexington to "savages." "I laugh at them as much as the members of the French Institute and British Royal Society, do at the marabouts of Morocco and Arabia."

After six mostly abrasive years at Transylvania, Rafinesque came home from a trip to discover that Horace Holley had confiscated his room and his position as librarian at the university. Why he did so remains a mystery to this day, but that there were ample reasons for a beleaguered administrator like Holley to dismiss such a thorn in his side seems clear enough. Before leaving, Rafinesque laid heavy Sicilian curses on the president and the school. Holley died the next year of yellow fever, and one of the university buildings was razed by a fire. Thereafter Rafinesque resumed

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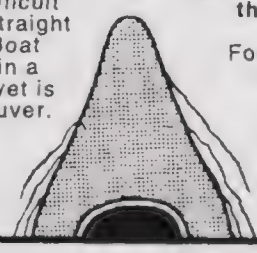
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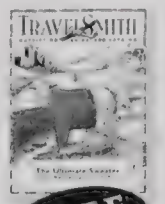

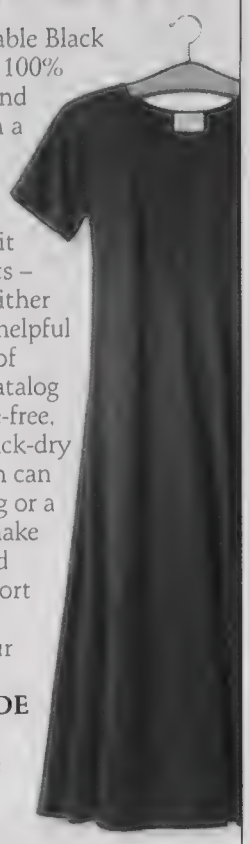

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collecting and lecturing, visiting local naturalists and the New Harmony commune of Robert Owen in Indiana. He briefly considered joining it, he said, but discovered that some residents were "jealous of me." He therefore moved on to Philadelphia. This, for the next and last 15 years of his life, was the base from which he passionately pursued things novel.

THE SHEER ENERGY, PHYSICAL and mental, of this small, fat, aging and often unwell man is astonishing. Among other things, he continued to naturalize energetically, from New England to Virginia, though he never went west of the Appalachians again. His contributions to botany, ichthyology, ethnology and archaeology won recognition and awards from scientific academies in Bonn, Naples, Paris, Vienna and Zurich, as well as Philadelphia and New York.

Rafinesque obtained patents on several new devices, including a steam plow (never manufactured) and an artillery piece of which he claimed "a single discharge will destroy one thousand men . . . one mile off or sink a large ship of war." He tried to interest the Mexican government in the weapon but failed. He also invented "Pulmel," an elixir that he sold as a cure for tuberculosis. Unlike many patent-medicine men, Rafinesque took his own concoction and believed firmly in its curative powers.

He became involved with a wine vineyard in Maryland; lectured on natural history at the Franklin Institute in Philadelphia, and taught at the institute's high school. In 1834 he founded a savings bank that guaranteed depositors a 6 percent interest rate. The institution did as promised and was a commercial success.

Whenever Rafinesque did something or thought about something—be it banking, making wine, raising silkworms, Mexican politics or Hebrews—he almost always then wrote

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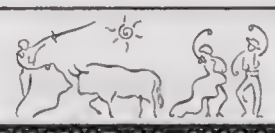

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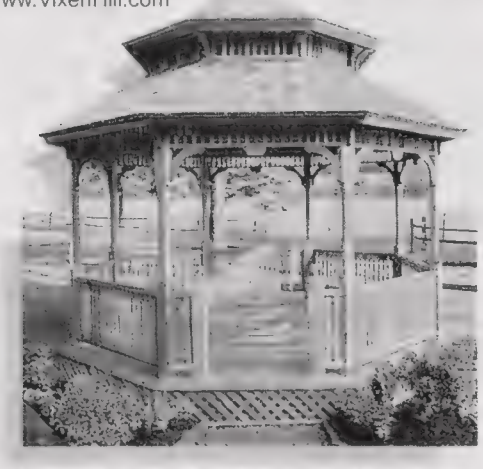

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at least a technical monograph, often a book, on the topic. Also, he frequently contributed to popular periodicals with essays and features about topical matters that especially exercised him. For example, he published dozens of articles in the *Saturday Evening Post*, some of them being what amounted to infomercials extolling Pulmel, the consumption cure he had developed. Not coincidently, Samuel Coate Atkinson, then the magazine's editor, moonlighted as a Pulmel distributor.

Estimates of how many books and articles Rafinesque produced range upward to a thousand. Determining the exact number and locating copies of them continue to challenge bibliographers and bibliophiles. Rafinesque contributed, sometimes using strange pen names, to obscure journals published irregularly in North America and Europe. Many of his books were self-published in editions of a hundred or less on the cheapest paper. Few of the originals survived.

Rafinesque's books always seem to have cost him more money than they made. For example, in 1832 his own income was $363.87, mostly from the sale of Pulmel. According to his account books, he spent $98.15 on food and domestic sundries; $190.72 on his publishing ventures and $92.80 on travel. The $17.80 deficit probably came out of his meager savings.

Of Rafinesque's books, *The World, or Instability*, a 5,400-line epic poem, is the grandest in concept. Appearing in 1836, it deals with, among other topics, the stars and light, angels and devils, peace, passion, war and women. All of this advances an explanation of how the world began, was then operating and might operate in the future. Sections of *The World* are wild and turgid to the point of incomprehensibility, but the book continues to interest scientific historians because in more lucid passages Rafinesque discusses, in verse, a theo-

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Rafinesque's notebooks at the Smithsonian are filled with natural history observations and illustrations.

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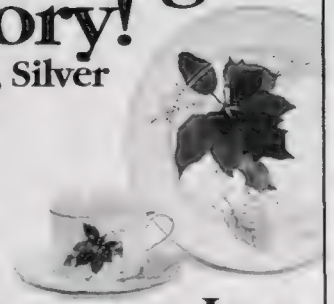

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ry of evolution that predates Charles Darwin's by more than 20 years. Biological dynamics had been on his mind since at least 1814, and in 1833 he had written, "Species and perhaps Genera also, are forming in organized beings by gradual deviations of shapes, forms and organs. . . . This is a part of the great universal law of perpetual mutability." With great complexity and at heroic length, Rafinesque expanded on this notion in *The World*, which begins:

> In endless shapes, mutations
> quick or slow,
> The world revolves, and all
> above, below,
> In various moulds and frames
> all things were cast,
> But none forever can endure
> or last.

The concept of natural selection did not occur to Rafinesque, but he did recognize the importance of mutations, as 20th-century evolutionists have and Darwin did not. In a modern introduction to *The World*, the scholar Charles Boewe writes that Rafinesque's "conception of the inex-

Rafinesque's drawing of a Franklin tree depicts the cycle of a seedpod.

haustible creative force of nature was simply far broader than anyone else's. This led him into ludicrous credulity . . . as when . . . he solemnly recorded the existence of *Litholepsis adamantinus*, the devil-jack diamondfish. . . . But he could make such mistakes because he thought almost anything possible in nature." (In several sections of *The World*, Rafinesque argues that life-forms probably exist on other planets.)

RAFINESQUE DIED OF STOMACH cancer in a Philadelphia rooming house in September 1840, alone and broke. The landlord took his books and collections in lieu of back rent and tried to sell his body to a medical school, but several Philadelphia naturalists intervened so that he could have a private, marked grave.

During his last years, Rafinesque wrote a short autobiography, *A Life of Travels and Researches in North America and South Europe*. Generally it is a bitter, error-filled book in which he brags unpleasantly and berates his colleagues. But it includes one touching, seemingly out of character note. As a "legacy to superior minds," Rafinesque left a list of things that he hoped they would act on after he was gone. He urged, for instance, that his plans for steam plowing, noncombustible houses, cooperative libraries, unions of working men and homes for orphaned girls be put into practice. Then this odd fish, the arrogant intellectual whose life had been so empty of tender emotions, made a final and extraordinary suggestion. Those who followed him should make every effort to organize "Societies of Happiness." Rafinesque provided no details on what might be involved, but there is always hope that this was another prescient idea. Beyond dispute, it is still a good one.

Like the clever subject of his 30th article for SMITHSONIAN, *Bil Gilbert is a man of many interests, naturalizing being one of them.*

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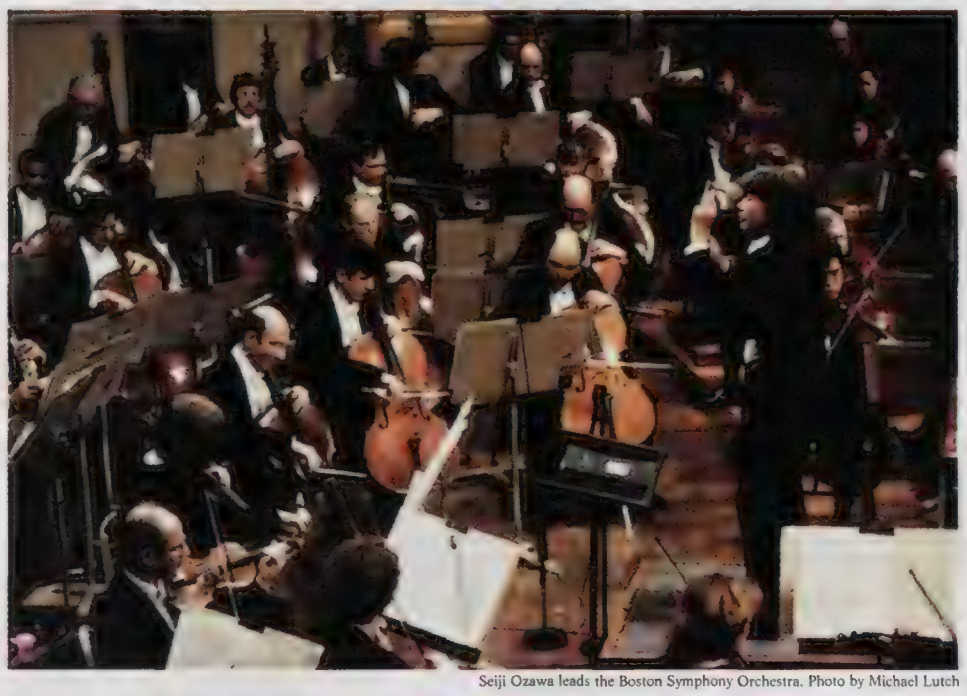

Seiji Ozawa leads the Boston Symphony Orchestra. Photo by Michael Lutch

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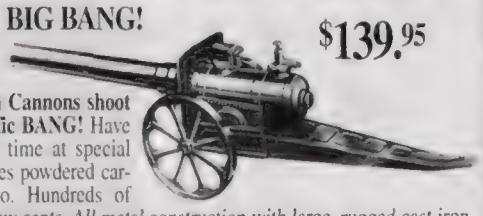

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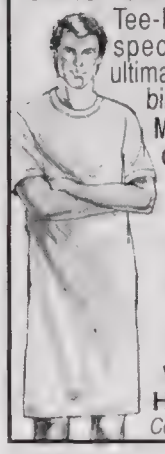

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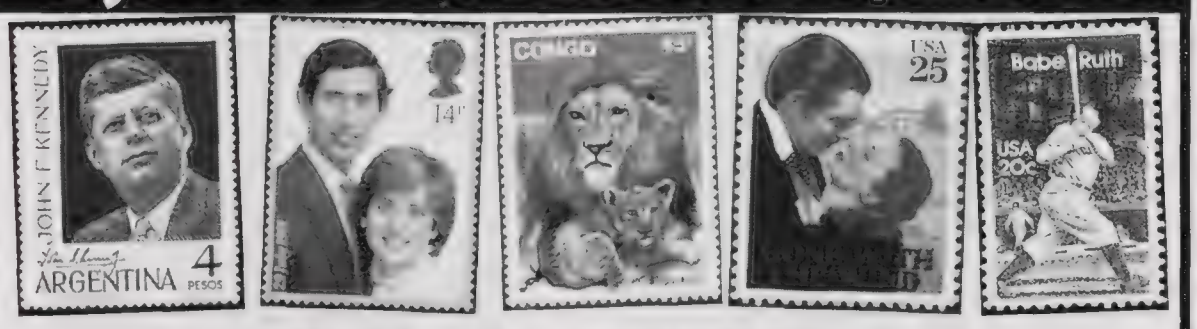

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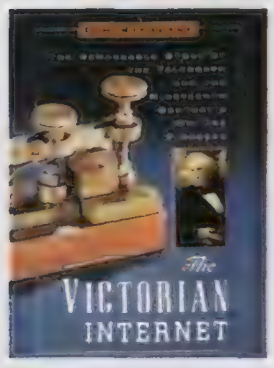
R E V I E W S

The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century's On-Line Pioneers

Tom Standage

Walker, $22



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In fact, the advent of telegraphic communication in the mid-19th century did more to change society, argues Standage, than the development of today's Internet. We were getting up-to-the-minute news by television and radio before the emerging on-line services opened a pipeline to personal computers. We could talk to friends and families with a telephone and get stock prices by calling a broker before e-mail was invented. But in the America of the 1840s, messages moved by boat, train or horseback.

Instantaneous electrical communication seemed so miraculous that Samuel Morse's first message on his telegraph line from Washington, D.C. to Baltimore, sent on May 24, 1844, asked, "What Hath God Wrought." Yet the practical benefits of the invention, reports Standage, were hardly obscure. The second message on that line, sent immediately after the words that had been so carefully composed for the historical record, was "Have you any news?"

Tom Standage, a British science writer, makes it clear that electric telegraphy didn't arrive like a bolt from the blue. Two French brothers, Claude and René Chappe, had built an optical/mechanical telegraph in 1791 and used it to send a message across ten miles in four minutes. Their invention was the basis for the semaphore systems—lines of towers signaling one another with movable arms or alternating black and white panels—that were built across France and England during the next few decades. But these systems were expensive to build and operate, they didn't work in the dark and their transmissions could be read by anyone along the line of sight.

Over the course of the 19th century this primitive network of flapping, clanking machines evolved into a global communication system. Independently invented in England and the United States, the electric telegraph soon crisscrossed continents with copper wire and linked them with underwater cables. Nimble-fingered operators sent, received and retransmitted messages day and night. Webs of pneumatic tubes moved printed copies of messages between nearby stations and, in Paris and other major cities, throughout the urban center. And cadres of messengers ran telegrams from the end of the transmission line directly to the recipient's home or office. "By the early 1870s," Standage writes, "the Victorian Internet had taken shape. . . ."

The story of telegraphy is vast and complex, and Standage could easily have written a book three or four times as long as *The Victorian Internet*. Wisely, he didn't. Nor does he feel compelled to point out each and every similarity that obtains between the telegraphic internet and its computer counterpart of today. Instead, he moves swiftly from highlight to highlight, using succinct summaries and memorable details to tell his story, and letting readers apprehend the parallels between the two technologies for themselves.

This is not the book for readers who want in-depth accounts of the lives of scientist-inventors like Thomas Edison or Charles Wheatstone, detailed financial histories of companies like Western Union, or technical treatments of subjects like the development of semaphore systems and undersea cables. But while Standage's history may be telegraphic, his writing is colorful, smooth and

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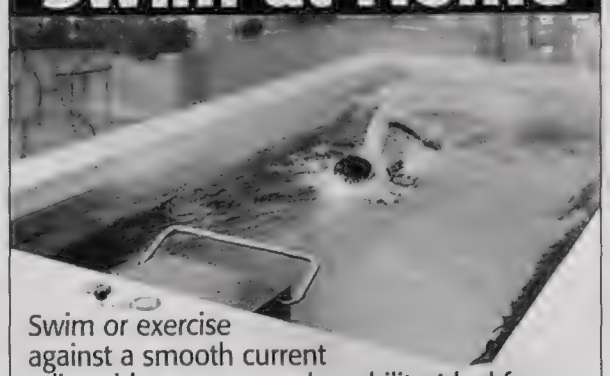

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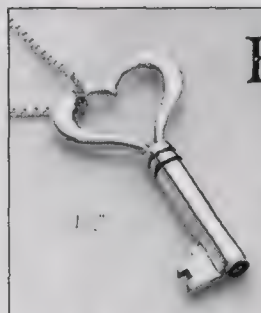

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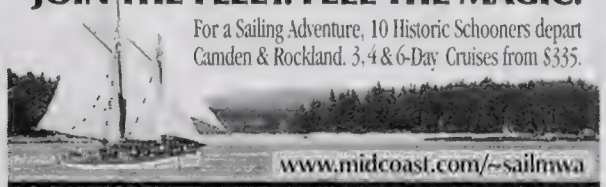

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John R. Alden, an anthropologist and archaeologist, has long been fascinated by 19th-century social history.

The Great Hill Stations of Asia

Barbara Crossette

HarperCollins/Westview, $28

THE FIRST TIME I saw the Himalayan hill station of Simla, almost 30 years ago, I had the eerie sensation of seeing Western civilization, or at least a fantastic colonial version of it, fading away before my eyes. Chattering monkeys gamboled like the mocking fates across the facades of the gothic edifices that were once the summer quarters of the imperial government of India, while half-timbered English cottages that belonged in tales by Beatrix Potter slowly rotted in the jungle. The imperial British raj seemed to remain alive only in the obsequious manners of aging hotel attendants and bureaucrats who had been trained to serve an empire upon which the sun was supposed never to set. Simla was not really dying at all, as Barbara Crossette makes abundantly clear in *The Great Hill Stations of Asia*. The lingering embers of imperial style have continued to imbue it and other once-exclusive watering holes of colonial elites, from Pakistan to the Philippines, with a colorful afterglow that survives even into the present day.

Crossette first became fascinated with hill stations while working as the *New York Times* New Delhi bureau chief. She has since returned to Asia many times, acquiring hill station lore as another traveler might collect exotic carpets or elephant

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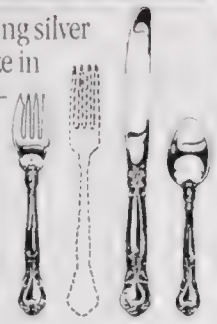

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tusks. The journey she recounts in this engaging book follows a rough arc that begins with the old British hill station of Murree, in the foothills above Pakistan's capital of Islamabad, and continues on through India, Sri Lanka, Burma, Malaysia, Indonesia and Vietnam. She concludes her travels in the Philippines, which, though younger Americans may not realize it, was for 37 years, until the independent commonwealth was established in 1935, the only United States colony in Asia.

These little towns carved from rocky mountainsides or nestled on high plateaus began mostly as sanatoriums or convalescent centers, but they soon became escapist retreats far from the tumultuous cities and hot,

In India, the average life span for an Englishman was 38, and for a woman just 28.

parched lowlands below. They served an important medical purpose in an era when cholera, malaria, dysentery and countless other tropical maladies were epidemic, and when both germ theory and the importance of modern sanitation were imperfectly understood. One 19th-century British army doctor in Ceylon calculated that a soldier between the ages of 20 and 40 was five times more likely to die there even in peacetime than at home in England. In India, the average life span for an Englishman was 38, and for a woman just 28.

The flavor of the hill stations was decidedly upper crust. One might stay in bungalows with names like Constancia Cottage or Dingle Dell, go out for an evening to the Gaiety Theater, and perhaps send one's daughter to Presentation Convent in order to

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obtain a proper education. "I verily believe that when the white man penetrates the interior to found a colony, his first act is to clear a space and build a clubhouse," wrote one memoirist who lived for years in the Burma hill station of Maymyo.

Especially in the British hill stations, dinners were formal affairs, and full-dress balls, elaborate costume parties, and an exacting etiquette were de rigeur. The journalist William Howard Russell described the Simla scene as "ball after ball, each followed by a little backbiting." At the same time, there was a certain giddy element to life in the mountains where, beneath the surface constraints, people loosened up considerably. Wrote one colonial expatriate, "There is the theory that anyone who lives above 7,000 feet starts having delusions, illusions and hallucinations. People who, in the cities, are the models of respectability are known to fling more than stones and insults at each other when they come to live up here."

Europeans had made it an article of faith that Westerners' bodies (and sometimes their minds) fell to pieces in the tropics. Few heeded the warnings of medical experts who told these Caucasian flowers that they were wilting in part because they insisted on overeating, overdressing, drinking too much alcohol and sleeping in closed rooms to avoid "miasma." At one presumably typical dinner at a Malaysian hill station in the 1840s, a visitor was regaled with wines, spirits and ale, and fed a choice of soups, fish, joints of sweet Bengal mutton, Chinese capons, Keddah fowls and Sangora ducks, Yorkshire hams, Java potatoes and Malay ubis, followed by a rice-and-curry course, cheese and fruit. Crossette writes: "A small school of academics, mostly American, has sprung up to explain this insanity as some kind of calculated policy of separation that called for distinctive (and, the imperialists thought, superior) living habits that must never be tinged or compromised by proximity to natives. However this inability to adapt may have been only that: a reflection of a stodgy, unimaginative people afraid to jettison convention. Errant behavior was sometimes known as 'going tropo.'"

Europeans insisted on overeating, overdressing and sleeping in closed rooms to avoid "miasma."

Crossette ends her journey with a visit to Baguio, which was established only in 1905 by a band of intrepid American expatriates who settled in the Philippines after the United States

acquired the islands at the conclusion of the Spanish-American War in 1898. Baguio is situated in a region of deep gorges and forested mountains about 120 miles north of Manila. In contrast to the stylish pomp of northern India's Simla and most of the other European hill stations, there was a peculiarly Calvinist earnestness pervading daily life at Baguio. Visitors lived in the spartan rooms and cottages that had their cultural roots in the Poconos and upstate New York. Despite Baguio's modern congestion, fast-food restaurants and cheap stores, certain things do not seem to have changed. Writes Crossette, with characteristic cockiness: "Is this place American or what? Checking into the Club John Hay in Baguio was like registering at summer camp all over again. I expected to be issued a towel and a hockey stick."

Crossette has a real affection for picturesque remnants of the colonial world—like the Savoy Hotel in Mussourie, India, where the front parlor "still had those ponderous, squarish, overstuffed British-inspired armchairs and settee," and a "Gothic writing desk with a useless telephone." During her stay there, she was attended by a steward and another ancient retainer, "a nineteenth-century figure bundled in Bob Cratchit scarves" who carried a lightbulb for the dark and cavernous bathroom. At the same time, she keeps a reporter's incisive eye to the dynamic reality of modern Asia. Far from disappearing, the old hill stations have become fashionable playgrounds for the nouveaux riches of Asia.

Everywhere the sacrosanct precincts of the 19th-century sahibs are being encroached upon by modern hotels, theme parks, karaoke bars and high-decibel pop bands. "The hill stations are overgrown, often overpopulated, and no longer European now, but most have not lost their unique appeal," Crossette writes. "Air-conditioning notwithstanding, the plains still fry in the sun, and the cities of Asia have only grown larger, noisier and more polluted."

No longer quaint artifacts of a bygone world, the hill stations increasingly are living prisms that reveal the helter-skelter transformation of once stagnant colonial societies into vibrant and rough-edged 20th-century ones.

Fergus Bordewich is the author of Killing the White Man's Indian: Reinventing Native Americans at the End of the Twentieth Century *and* Cathay: A Journey in Search of Old China.

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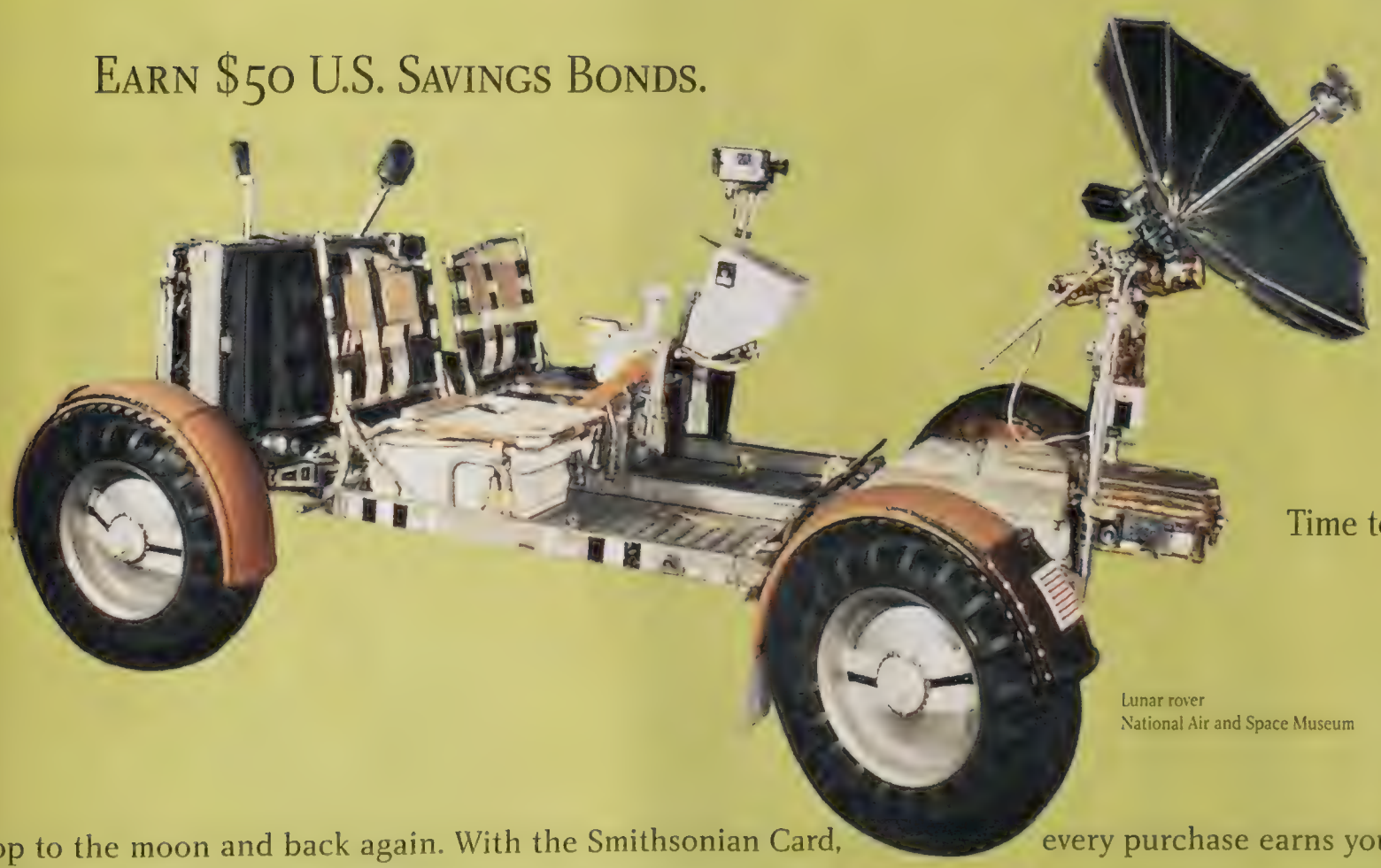

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THE LAST PAGE

"Let's Get Dale to Play!"

BY BRUCE WATSON

His standards rang out on St. Patrick's Day, Easter and a dozen more birthdays.

WHEN MY DAUGHTER ENTERED FIRST grade last fall, I was not afraid to raise the really tough questions. Striding up to her teacher, I asked, "Who's your class accordion player?"

My own first grade had an accordion player, and I assumed the accordion was still the official instrument of first grade. I was shocked to find that not a single child in my daughter's class played it. Lawrence Welk died in vain.

Dale Slaney was our accordionist. He was as big-eared and dorky as the rest of us in 1959. This was the age of Brylcreem, and a little dab did Dale into a freckle-faced rube with an accordion strapped across his chest.

The occasion for a performance mattered little. A birthday? Miss Barnes would light up and say: "Let's get Dale to play 'Happy Birthday' for us!" And Dale, his dark hair slicked back and a grin from ear to ear, stood in front of the blackboard and played "Happy Birthday," then "Lady of Spain."

The other first-grade class also had an accordion player, Betty Jo Walker. She played a passable "Happy Birthday," but she couldn't play "Lady of Spain." By the third class birthday, we all hated the song, but it did give us a sense of belonging, like an alma mater. Dale's accordian was always there, except for the week Nick Riley hid it in the rest room.

Still, we thought we'd only have to hear Dale on birthdays. Then came Halloween. "Let's get Dale to play a Halloween song!" And Dale played "Happy Birthday," then "Lady of Spain." Wiser kids were beginning to suspect something. "Hey, he only knows two—"

"Shhhhh!" Miss Barnes shout-whispered. "The only sound I want to hear from you, Nick Riley, is applause."

Young musicians don't start on the accordion anymore. They go straight to the violin. This explains the rise of ADD—Accordion Deficit Disorder. ADD makes you wonder what schools are teaching these days. How will kids compete in the global economy without an accordion player in their classroom? How will they learn patience, fairness and acceptance of mediocrity unless they suffer accordion at an early age?

Listening to Dale play "Happy Birthday" for Thanksgiving, we learned a vital skill. We learned to sit still and watch a well-meaning person make an utter fool of himself. It's a skill I put to good use throughout school and later at many jobs. Yet, tragically, today's kids are not learning it. No wonder so many young adults shout out during movies. We elders can only shake our heads and whisper: "No accordion training."

As Christmas approached, rumor had it that Dale was learning another song. By the party, however, he had mastered only the opening bars of "America the Beautiful." We had a patriotic Christmas in 1959, along with "Lady of Spain" at Miss Barnes' request. And Christmas, she reminded us, is the happiest birthday.

Dale's standards served him well on Lincoln's Birthday, when his accordion had shreds of brown paper towels on it. They rang out on St. Patrick's Day, Easter and a dozen more birthdays. In late June, when he played the opening of "America the Beautiful," first grade was over, and so was our ordeal by accordion. The upper grades were all business—spelling, long division, "How a Bill Becomes a Law." We never heard an accordion again in school, but we had learned how to listen.

To fight ADD, I am desperately searching for Dale Slaney. Perhaps he has a child who could visit my daughter's class. Then her teacher could say, "Let's get Dale Jr. to play an Earth Day tune! And my daughter will have to sit and take "Lady of Spain." Like a first grader.

JIM FLANAGAN

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